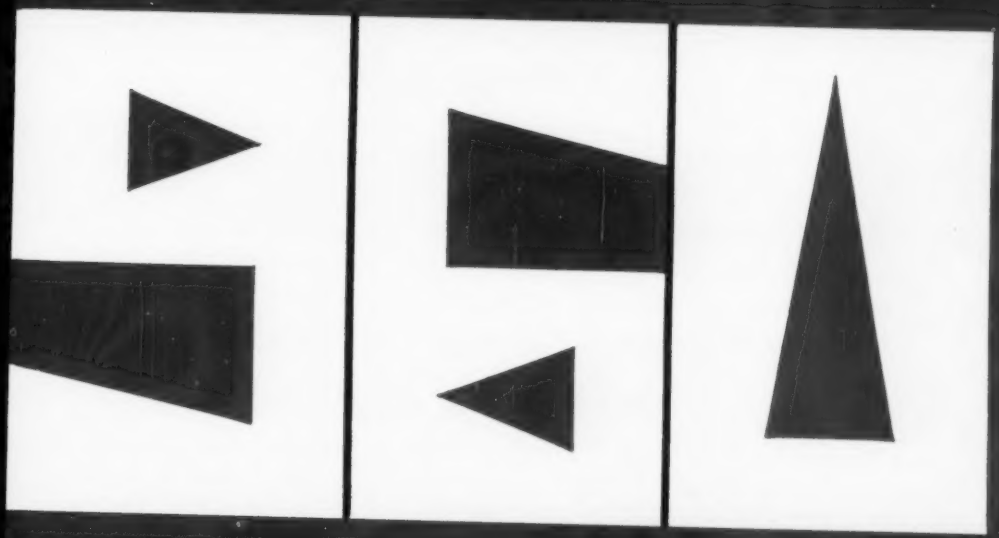
diesel power

APRIL 1960



ENGINE SPECIFICATIONS

Richard L. Spetka, *Manager Power Engine Sales, The Cooper-Bessemer Corporation, explains...*

How Cooper-Bessemer powered "Markham" will set dredging records

This 339 ft.-long vessel is the first seagoing hopper dredge in a decade. Engineered by the Marine Design Division of the Army Engineers, the *Markham* will hold 2700 cu. yds. dredged material in its hoppers, will dredge to a depth of 45 ft.

Two 16-cylinder, 4250 hp @ 327 rpm Cooper-Bessemer turbocharged diesel engines drive tandem generator combinations for propulsion, dredge pumps and auxiliary power. These Cooper-Bessemer LSV-16T engines are equipped for operation on either residual or diesel fuel, with automatic changeover to diesel fuel at low loads.

Call the nearest Cooper-Bessemer office for engineering assistance in the planning of *your* marine power installations.

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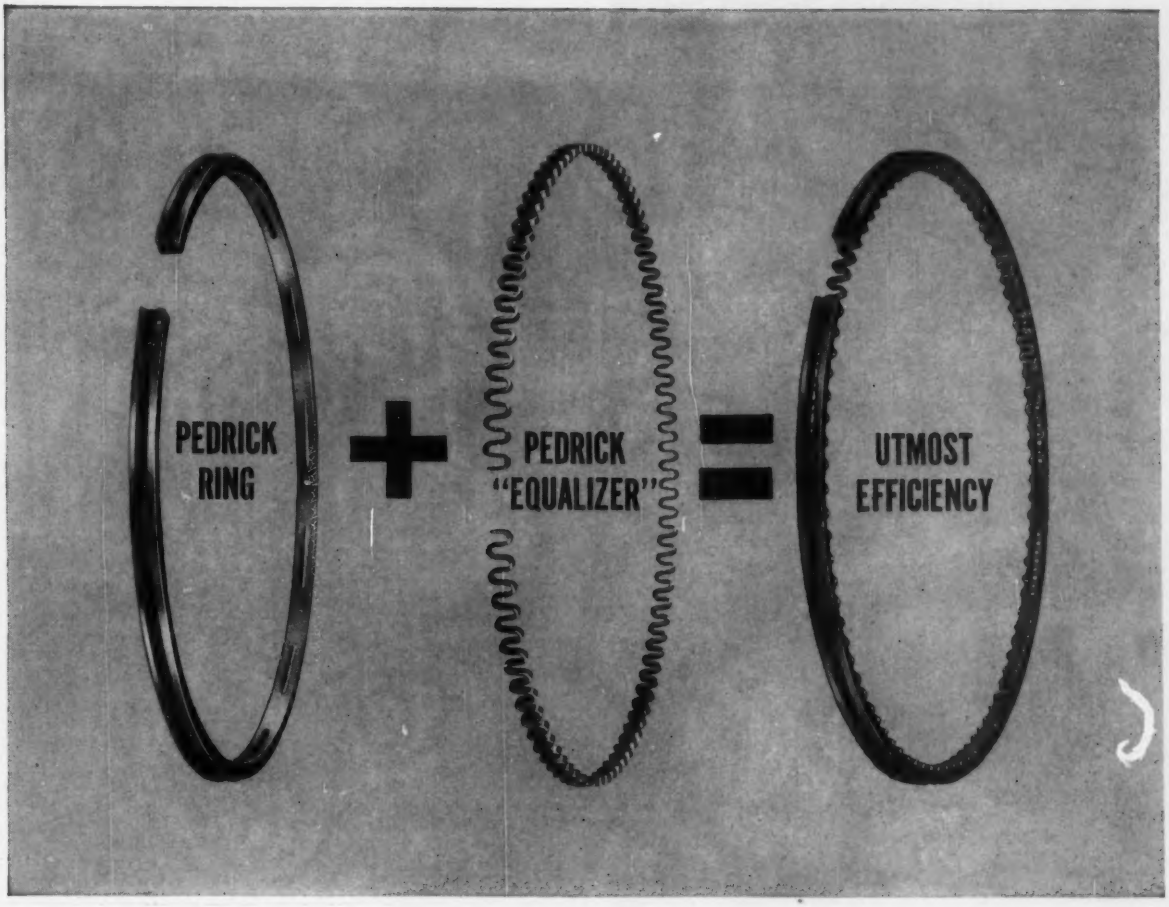

WHY IS THIS SO? For these reasons:

1. **Pedrick Formflex rings are radially thinner and thus more flexible than other rings. A reduction in radial thickness of as little as 20% *doubles* the ability to flex and *conform*.**
2. **The exclusive "Equalizer", which is a feature of Pedrick Formflex rings, delivers a tension which is absolutely uniform, correct and long lasting.**

Utmost efficiency in oil control, power delivery and fuel consumption is the result when you use Pedrick Formflex rings in complete cylinder sets, available for most popular engines. Engineering service available also for special problems. Phone or write WILKENING MANUFACTURING Co., Philadelphia 42, Pa. Saratoga 9-3770. In Canada: Wilkening Manufacturing Co. (Canada) Ltd., Toronto 2

Pedrick

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PEDRICK PIONEERED CONFORMABLE RINGS FOR BIG-BORE ENGINES

New light, low-cost Hercules Diesel installed for use in city delivery

Motor Cargo, Inc., of Akron, Ohio, is a major carrier operating more than 2,000 vehicles in a network covering the northeastern part of the country.

They are experimenting with the new Hercules truck diesels, using a 20,000-22,000 pound GVW vehicle powered with the lightweight, low-cost—only $1,400 list price—D-298-H engine. This six-cylinder diesel is rated 115 horsepower at 3,000 RPM and weighs only 850 pounds.

Check these advantages — diesel fuel economy, simple installation, low maintenance costs, low original cost—and you have the reasons Motor Cargo made this move.

Hercules is the first U.S. engine maker to design diesel power plants specifically for light and medium-weight trucks. You don't have to pay high-price or high-weight penalties for diesel economy any more. Specify your next truck with a Hercules diesel, available in models from 50 to 175 horsepower.

If you are about to major-overhaul a gasoline-powered vehicle, call your Hercules distributor for the facts on how you can save with Hercules diesels. Or write Hercules Motors Corp., Canton 2, Ohio.

HERCULES

HERCULES MOTORS CORPORATION
Canton, Ohio

WATCH HERCULES FOR THE "NEW LOOK" IN ENGINES

PEAK POWER OUTPUT FOR HEAVY-DUTY EQUIPMENT...

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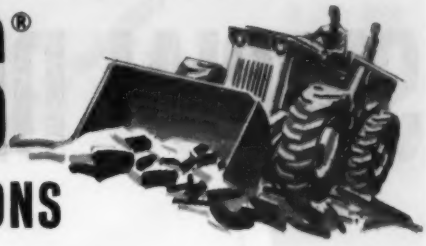

POWER SHIFT TRANSMISSIONS and TORQUE CONVERTERS

Rockwell-Standard's Hydra-Drives units make hard work easy for heavy-duty equipment. The result . . . smooth, efficient, economical operation. A torque converter and 4-speed transmission in one compact package, the Hydra-Drives Power Shift Transmissions have been proved in hundreds of vehicles. They eliminate engine lugging and heavy shock loads. A 3-to-1 torque multiplication makes starting fast and effortless—even with heaviest loads.

Just a flip of the operator's lever accomplishes power shifts without interruption of the power flow. Automatic features of the converter and ease of power shifting simplifies operator training and lengthens vehicle life.

With four speeds forward and reverse, the Hydra-Drives Power Shift Transmissions are ideally suited for vehicles which must travel in both directions during a normal work cycle.

Hydra-Drives Torque Converters are the simplest, most efficient made. They can be matched with any transmission for easier, more efficient operation.

HYDRA-DRIVES BDB Transmission

- Four speeds forward and reverse.
- Full power shifting.
- For equipment up to 175 h.p.

HYDRA-DRIVES CDB Transmission

- Four speeds forward and reverse.
- Power shift in each range both forward and reverse.
- For equipment up to 250 h.p.

HYDRA-DRIVES Torque Converter

- 3-to-1 torque multiplication.
- Available separately, or with Hydra-Drives Transmission.
- For vehicles up to 500 h.p.

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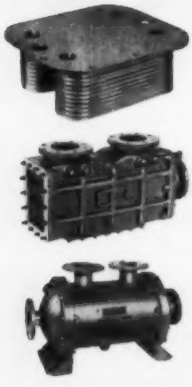

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GENERAL MOTORS STAMPS OUT HEAT ON HARD-WORKING MAIL BOAT WITH RELIABLE HARRISON OIL COOLERS!

The mail must go through—and does—with Harrison on the job. The Westcott II, Great Lakes mail boat, delivers mail to an average of 73 ships a day . . . to 145 ships on a record-breaking day! This rugged 24-hour duty in all kinds of weather calls for reliable performance. And Harrison has been selected to cool the engine oil on this diesel-driven postman. Harrison—with a half century of experience in the heat-control field—assures you of top-quality products that are researched and engineered to control vital temperatures with maximum efficiency. That's why you'll find Harrison heat exchangers in every line of defense . . . in every line of industry. If you have a cooling problem, rely on Harrison for the answer.

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editor's notes...

Engine Specifications—Page 431

Don't miss our editorial this month! "Something to Push For . . . " tells you why you have a vital interest in lightload-shorthaul. It's on Page 23 . . .

Highlights for this month on Page 25 will give you up-to-the-minute viewpoints of some engine builders—how they feel their lightload-shorthaul programs are developing. There are some eye-openers here . . .

Our Special Truck Dieselization Report continues on Page 66 of this issue with a report from Ford Motor Company official, E. R. Klinge. He hammers home the case for diesels across-the-board with a carefully documented one-two-three punch. "All Trucks Can Be Diesel—Fact or Fancy?" is an interesting objective report. And it's not a whitewash—you'll find pro arguments here as well as con . . .

Next stop on our Special Truck Dieselization Report takes us to Scotland. English have more diesels than gasoline engines in their low GVW vehicles—and you'll find the reasons why on Page 70. Operating figures for 3-wheelers and 4-wheelers are broken down to the last dollar and cent.

Our third report on Truck Dieselization finds us out in Denver at Dobbs GM Diesel where repowering is the order of the day. They've already completed 22 conversions . . . and really know the ins-and-outs of this end of the diesel business. We asked Dick Jefferies the questions—and his answers, we feel sure, will interest you whether you're truck owner or distributor. It's on Page 74 . . .

What does a top construction company do in the Wintertime when they're not a-building roads? Answer is they use slow-time to good advantage, bringing equipment up to snuff. This month's Dieselman, George Swailes, has over 30-years of experience with diesels. You'll find his story on Page 34 . . .

Newest thing in filters— a combination full-flow/by-pass filter from Luber-Finer— is reviewed in detail starting on Page 36. If you're interested in cutting servicing time and improving your filtration (and who isn't?) better read this one . . .

Mercedes-Benz is moving in fast with complete merchandising plans for their engines and diesel-powered buses. For first hand information on which way they're moving . . . and who's heading up the new US-Canada sales and service setup, turn to Page 39 . . .

A modern piston is a mighty important part of any engine— especially the diesel. Thinking, planning and a lot of solid sweat goes into its development. You'll follow Gillett & Eaton, step-by-step, as they design a new cast iron piston. Story starts on Page 62 . . .

Extra Copies April Issue — $2.
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diesel power

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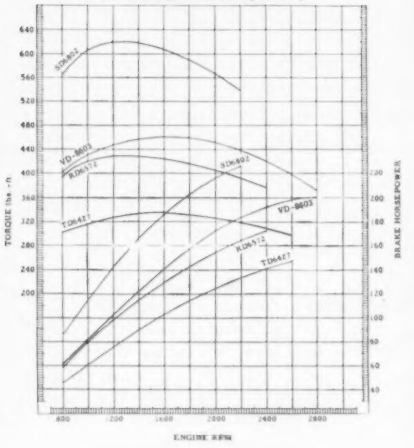
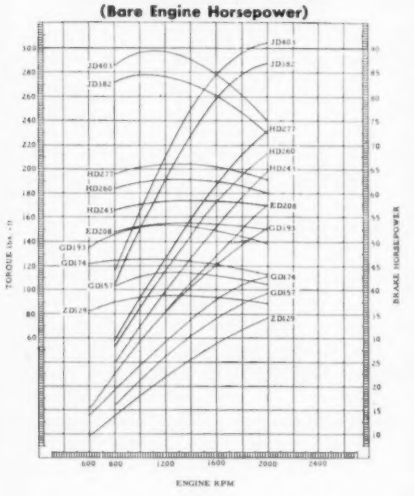
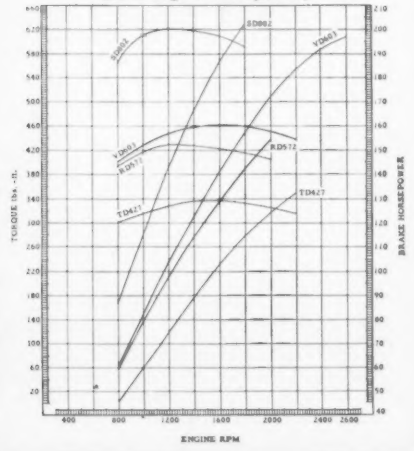


AGRICULTURAL DIESELS
(Bare Engine Horsepower)



INDUSTRIAL DIESELS
(Bare Engine Horsepower)



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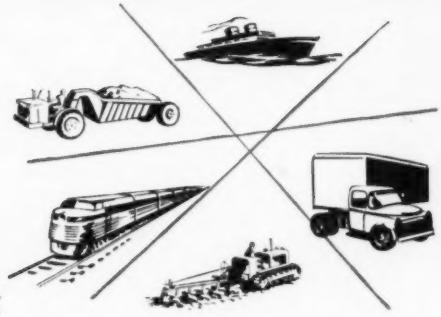
Aeroquip Hose Lines and Couplings Add Dependability, Simplify Diesel Engine Maintenance



Truck or locomotive, construction or farm machinery . . . on every diesel application, Aeroquip Hose Lines save the user money because they last longer, cost less to replace.

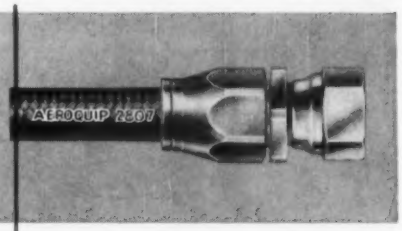
Designed to highest quality standards, Aeroquip Hose Lines resist the effects of engine vibration and corrosion. They can always be counted on to provide dependable service.

Aeroquip Hose Lines simplify replacement problems. With a supply of bulk hose and reusable fittings, fluid lines are easily assembled, in shop or field, with simple hand tools. Always specify Aeroquip Hose Lines for your equipment.

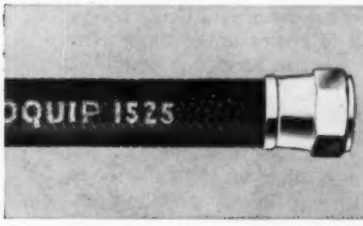
Engineering Assistance Available to Manufacturers of Diesel Equipment.

1503 Single Wire Braid Hose and Reusable Fittings are recommended for medium pressure hydraulic, lube and fuel oil, water and air lines up to 3000 psi. Sizes from ¼" to 3".

2601 Lightweight Single Wire Braid Hose and Reusable Fittings are recommended for engine fuel and lube systems up to 125 psi. and for temperatures up to 300° F. Sizes from ¼" to 2".



2807 Teflon Hose and patented* ***"super gem"*** Fittings are recommended for steam and compressor discharge lines. Sizes from ¼" to 1¼".



1525 Cotton Braid Hose and *SOCKETLESS* **Fittings** are recommended for oil, fuel, air, and gauge lines on engines and other applications up to 250 psi. Sizes from ¼" to ¾".

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SOCKETLESS, PUSH-PULL and FLEXMASTER are Aeroquip Trademarks
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DP-60

PROVIDENCE HOSPITAL, Seattle, Wash., installing Waukesha Diesel Enginator, 350 KW stand-by unit.

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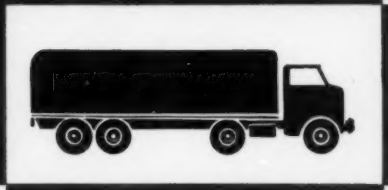

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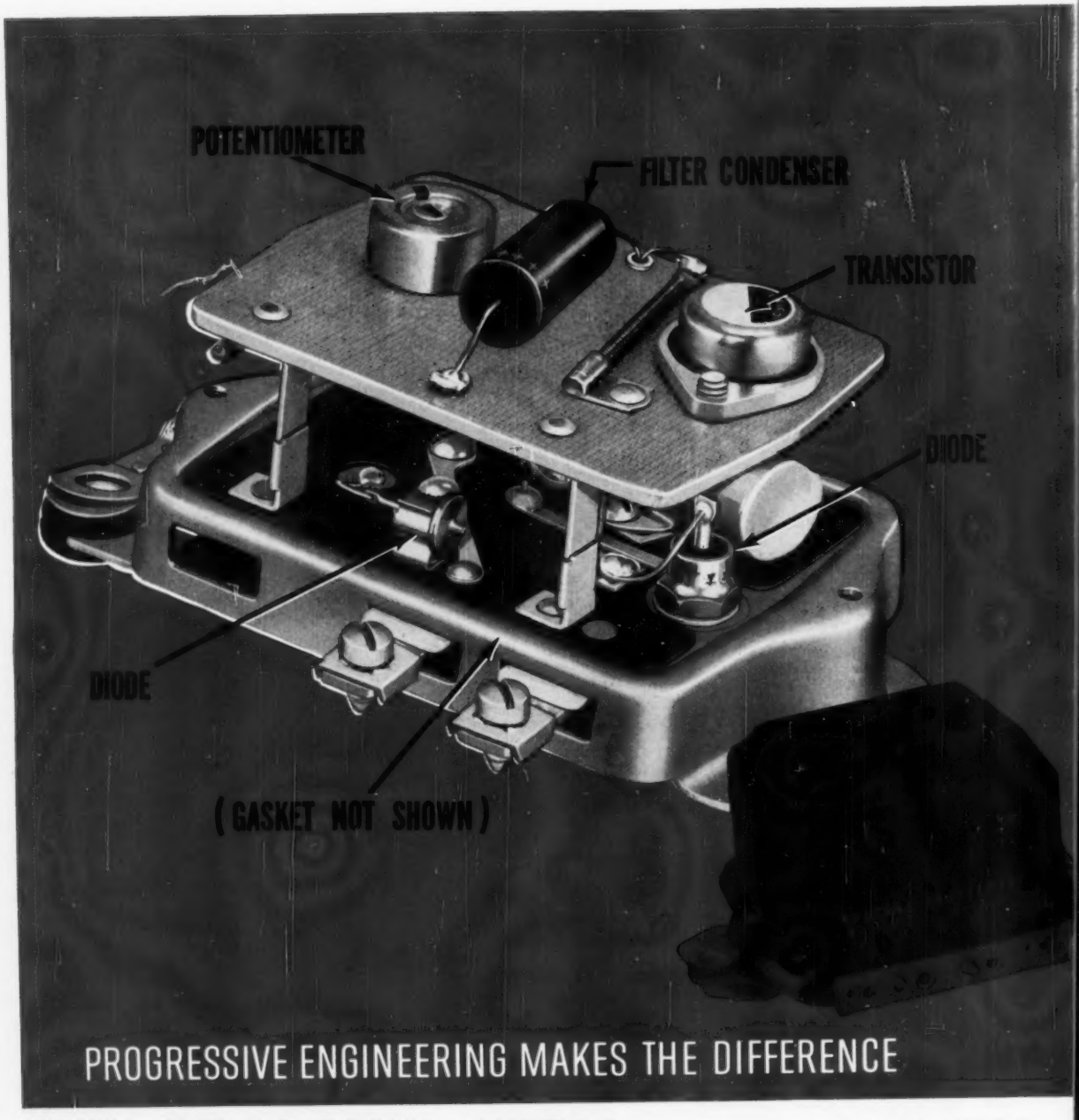

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Now you can choose between *two* modern new Delco-Remy regulators—the most accurate available today. One is a full-transistor model, the other transistorized.

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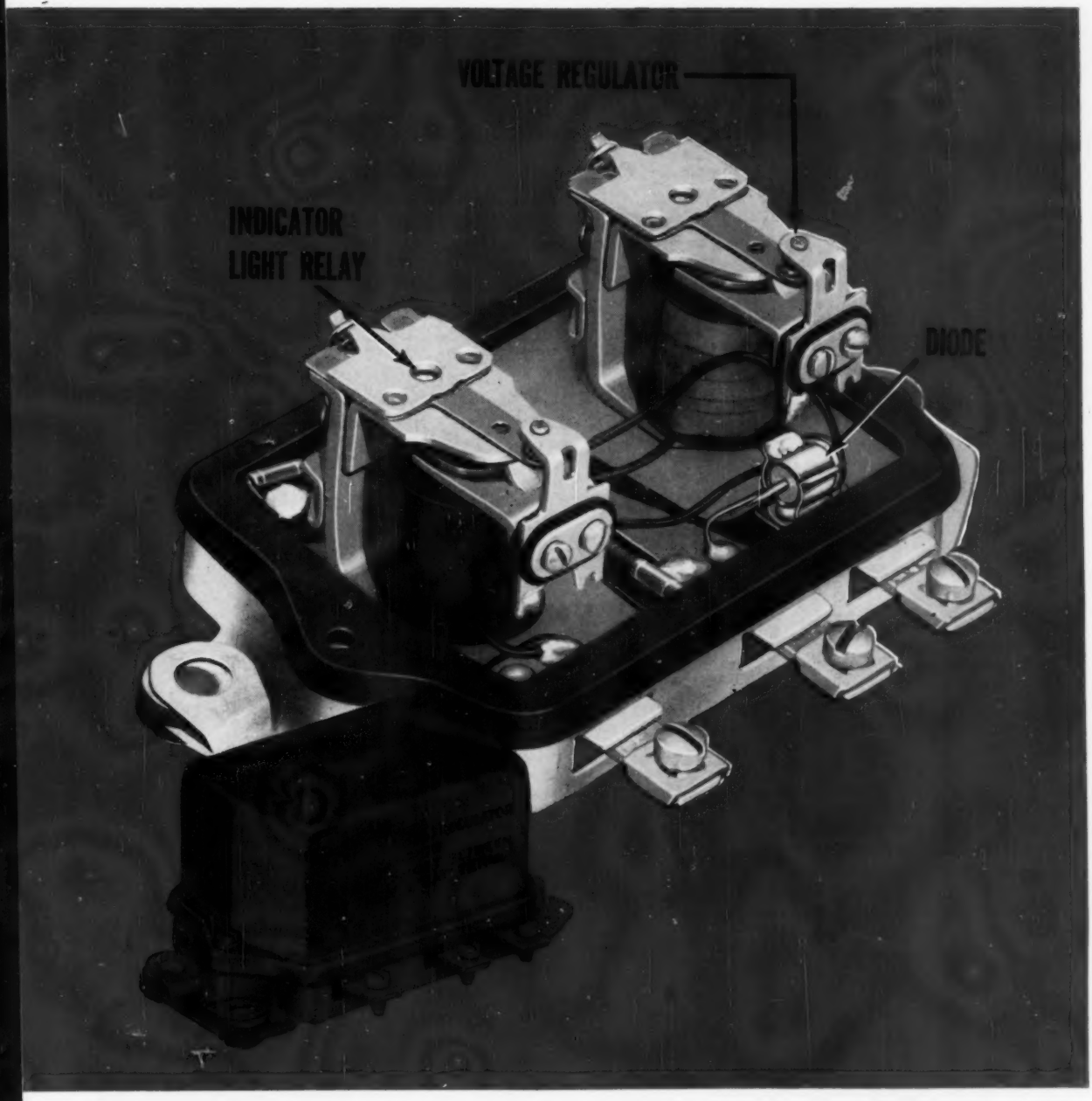

AND TRANSISTORIZED VOLTAGE REGULATORS

permits high field current for improved generator performance with low non-inductive current through the contacts for greatly extended contact life. Models are available for circuits containing either ammeters or indicator lights. All units are temperature compensated to better match battery voltage requirements.

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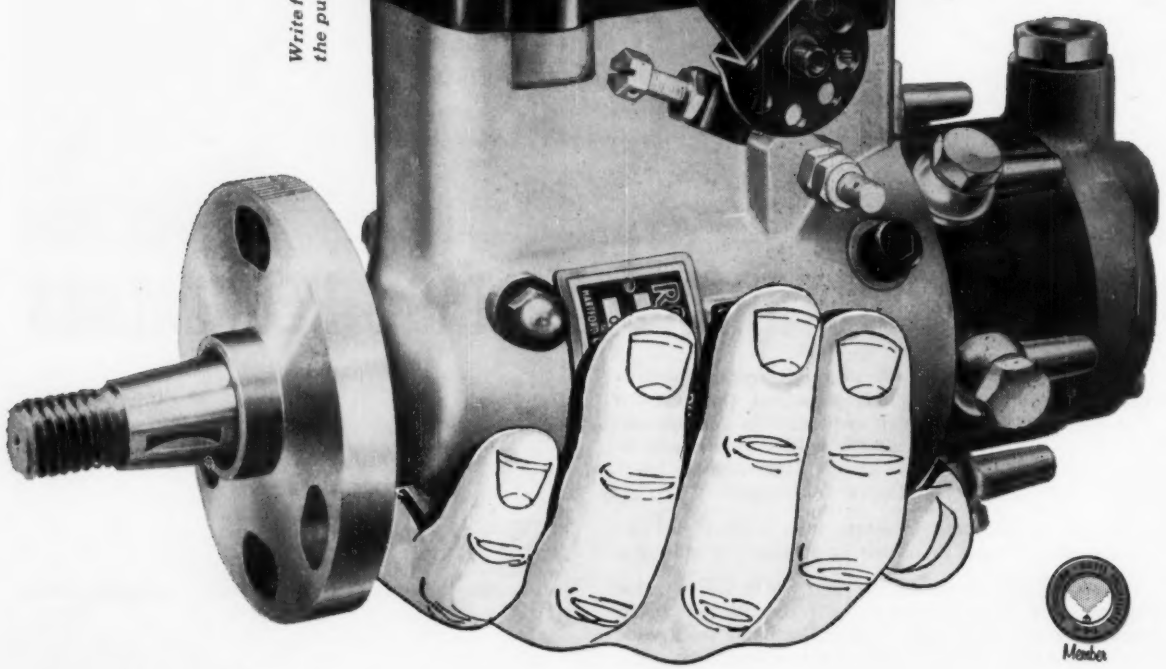

Write for guides to better fuel injection. One features the pump, the other an efficient, economical filter.

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Whatever your piston ring requirements — Plain, Full Sealing, Segmented or Oil Wiper — there's a job-engineered Cook ring to fill the bill.

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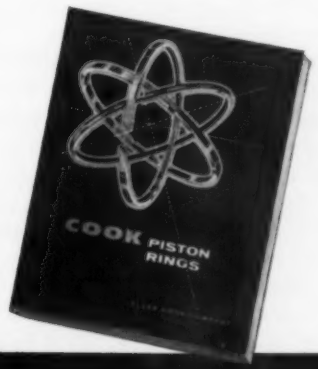

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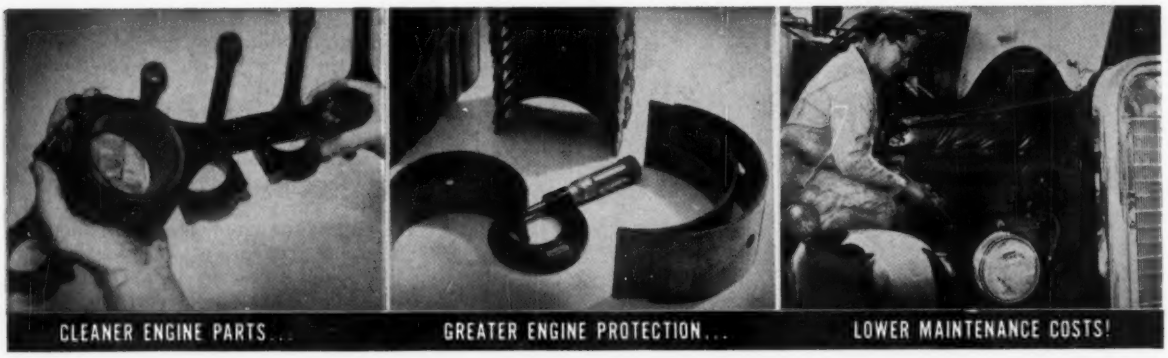

RPM DELO Oils have been quality leaders in the lubricant field for over 25 years—the most popular dual-purpose engine lubricants ever developed.

Now, Super RPM DELO Special Lubricating Oil sets a new standard of quality. Developed ahead of diesel engine design, it upgrades performance in your diesel and heavy duty gasoline engines—thoroughly tested in the laboratory and under the most severe field conditions. It is particularly effective for mixed fleet operations.

Super "RPM DELO" Special is compounded with Detergent-Action additives, corrosion and oxidation inhibitors and defoaming agent. These built-in properties more than double its over-all compounding effectiveness, assure cleaner pistons, rings, and valve lifters, greater engine protection. In performance it surpasses Supplement #1 level oil and results in longer trouble-free engine life with lower maintenance costs.

For longer engine life, real engine economy, ask your local representative about Super "RPM DELO" Special, *or write any company listed below:*

STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • **STANDARD OIL COMPANY OF TEXAS,** El Paso
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • **THE CALIFORNIA COMPANY,** Denver, Colorado

THERE'S NO ROOM FOR DOUBT NOW!

wix®

POROSITE® FILTERS ARE PROVED..

OK +

SAVE OIL SAVE TIME SAVE LABOR

WIX POROSITE Diesel Lubricating Oil Filters have proved themselves where proof is conclusive . . . on the job. The principle of filtering Diesel lubricating oil through paper faced many who said it couldn't be done. *But* WIX *did it!* WIX, who has pioneered so many advances in Diesel Oil Filtration, now offers a development that SAVES A BIGGER DOLLAR WITH A BETTER PRODUCT. Yes, WIX answers high maintenance costs with Filters that Save Oil, Save Time and Save Money.

Write **for full particulars**

Wix Corporation, Dept. DP
Gastonia, N. C.

Please send full information on WIX POROSITE Lube Oil Filters.

Name_____

Company_____

Address_____

City_____ Zone____ State_____

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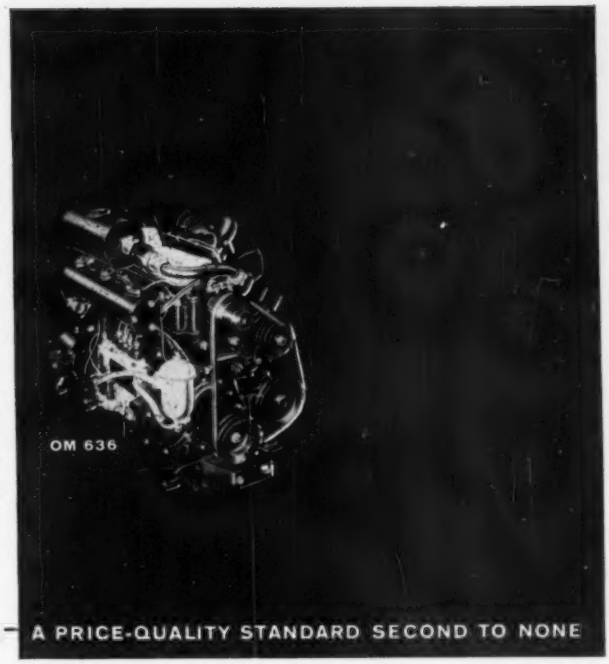
ANNOUNCING
A NEW
ORGANIZATION
CREATED TO
HELP YOU USE
MERCEDES-BENZ
DIESEL ENGINES
TO THE FULLEST
ADVANTAGE

We are proud to announce the formation of the Industrial Division of Daimler-Benz of North America to serve your diesel engine needs.

A seasoned team of experts in sales, supply, engineering and service is ready to work with you from the planning stage on. They will enable you to fully utilize the economy, compactness and versatility of Mercedes-Benz diesel engines.

Whether you need marine, industrial or generator-set diesels, there are Mercedes-Benz engines with exactly the right characteristics for your application... and there are Daimler-Benz specialists who can help you take advantage of them.



MERCEDES-BENZ DIESEL ENGINES — A PRICE-QUALITY STANDARD SECOND TO NONE

SOLE IMPORTERS FOR THE UNITED STATES AND CANADA:

DAIMLER-BENZ OF NORTH AMERICA, INC.

INDUSTRIAL DIVISION

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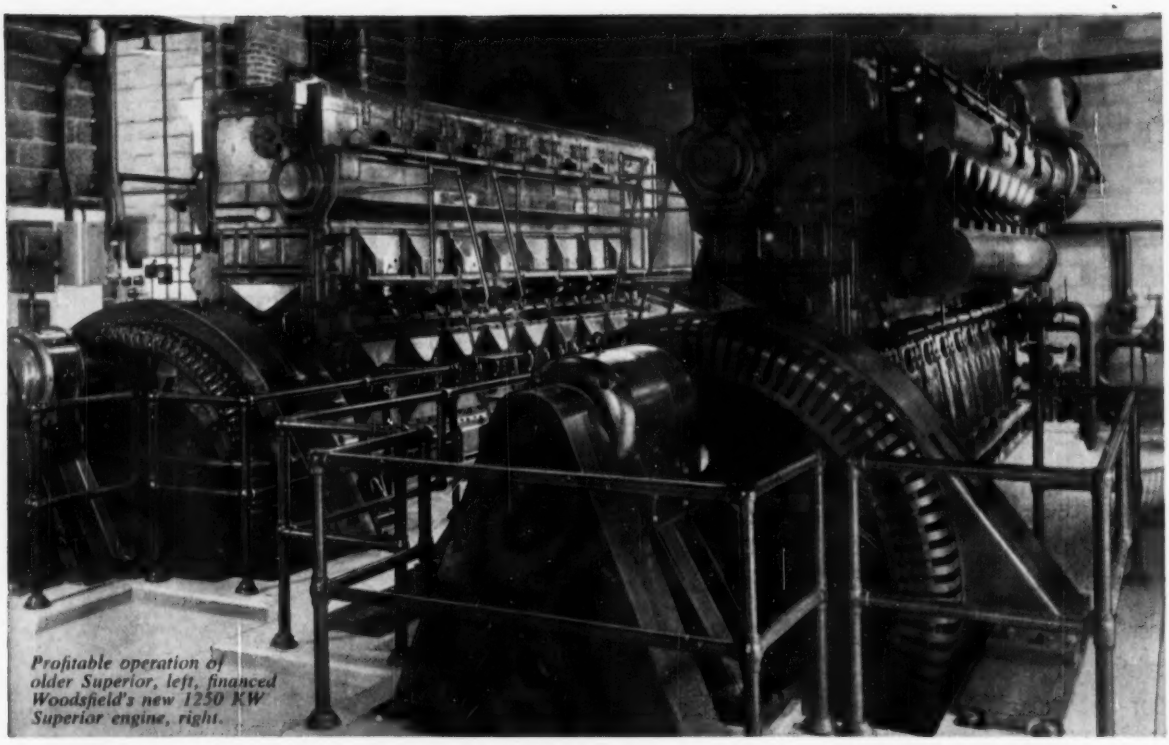
DAIMLER-BENZ OF NORTH AMERICA, INC. IS A WHOLLY OWNED SUBSIDIARY OF DAIMLER-BENZ A. G. OF STUTTGART, GERMANY



Profitable operation of older Superior, left, financed Woodsfield's new 1250 KW Superior engine, right.

80-GDS-8 runs 44,000 hours without overhaul, cuts fuel cost 50%, pays for second diesel!

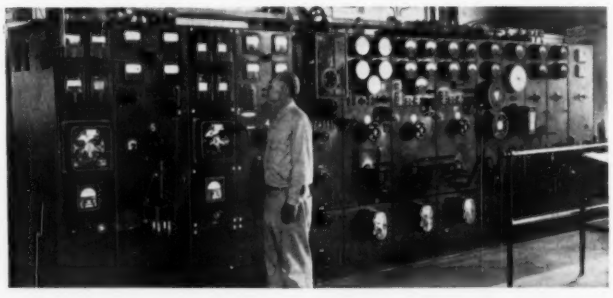
Superior engines power Woodsfield's boom!

Olin Mathieson's new aluminum plant on the Ohio River, 18 miles from Woodsfield, caused the town to grow more during 1957-59 than in the previous 25 years combined! Power consumption soared from 2,921,740 KW in 1956 to 4,167,260 KW in 1958, as acres of new worker homes hit the line.

But economy-minded city fathers and maintenance-conscious power plant personnel met the crisis, aided by two Superior engines. The first, an 80-GDS-8 dual-fuel of 600 KW capacity, entered service in 1950. During the next 7 years, it reduced costs per KWH 50% as compared to Woodsfield's 3 older straight diesels. After 44,000 hours operation, it was overhauled in 1958. The only replacements needed were connecting rod bearings. Piston rings were replaced, too, although their .002″ wear was well within tolerances.

This Superior did more than supply consumers with low-cost electricity. Power profits also financed various municipal improvements, including a second Superior engine-generator! The new 80-GDSX-8 supercharged dual-fuel of 1250 KW capacity commenced operation in early 1958. In addition to maintaining low fuel costs, it operates more than 50,000 horsepower-hours per gallon of lube oil!

For every municipal need, White Superior offers economical diesel, dual-fuel, or gas engines ranging from 190 to 2150 HP, or 150 to 1500 KW!



L. W. Marple, plant superintendent, checks controls of town's five power-producing engines.

Superior ENGINES · ATLAS Imperial DIESEL ENGINES · White DIESEL

White Diesel

WHITE DIESEL ENGINE DIVISION
THE WHITE MOTOR COMPANY
Plant and General Offices: Springfield, Ohio

Nordberg Diesel Installation Photo

Diesel Protection Assured with the *Alnor* Pyrotac®

A continuous check on the operating efficiency of each cylinder in a diesel engine is indicated on the Alnor Pyrotac.

Improper injection, blow by, stuck rings, failure of cooling, overload, or other malfunctioning of the engine is immediately registered by the individual exhaust thermocouples and is indicated on the dial of the Pyrotac. When the instrument is set for the normal exhaust temperature range, any variation up or down shows up immediately on the Pyrotac dial and an alarm signal informs the operator.

The motor driven switch unit of the Pyrotac monitors the exhaust temperatures of each cylinder continuously, thus any trouble in an individual cylinder can be spotted immediately.

Alnor Pyrotac models are available up to 20 circuits. Manually operated pyrometric indicators are sufficient in some installations.

Most diesel power plants operating today are Alnor equipped. Write for bulletin 4703.

Alnor INSTRUMENTS

ILLINOIS TESTING LABORATORIES, *Inc.*

Room 507 • 420 North LaSalle Street • Chicago 10, Illinois

ADVANCED DESIGN PISTONS

By GILLETT AND EATON

for Longer Heavy Duty Service

TROUBLE-FREE with thousands in use

★ Low initial cost ★ Low cost per mile

★ Amazing increase in piston life

★ Maintains new engine power and performance

G and E WIRE INSERTS PUT CAST IRON WEAR IN TOP RING GROOVE

G and E Wire Insert Piston before machining (left) and after ring grooves are cut (right) showing how the steel wire forms a tough wear-resisting surface on both faces of top ring groove. The patented ferrous plug molded in the head (for diesel pistons) prevents burning through head and lengthens diesel piston life!

With the thousands of G and E "Wire Insert" Pistons in use for periods up to 3 years—a phenomenal record for trouble-free operation has been established. The "Wire Insert" greatly reduces top ring groove wear and increases piston life.

The "Wire Insert" piston design—exclusive with G and E—combines all the advantages of aluminum alloy pistons with the long life of steel in the top ring groove lands. No noticeable increase in weight—unequalled for rapid heat flow—and at low cost.

A pre-shaped steel wire is cast into the piston where the top ring is located. When the grooves are machined, the closely spaced wire surfaces form hard bearing areas on top and bottom faces of the groove. Result—reduced ring land wear, longer piston life at lower cost.

as LIGHT as aluminum . . . wears LIKE IRON

VANASIL*

"OIL-ABSORBING" PISTONS FOR GASOLINE AND DIESEL ENGINES

*Gillett & Eaton's trademark for a Hyper-eutectic silicon aluminum alloy

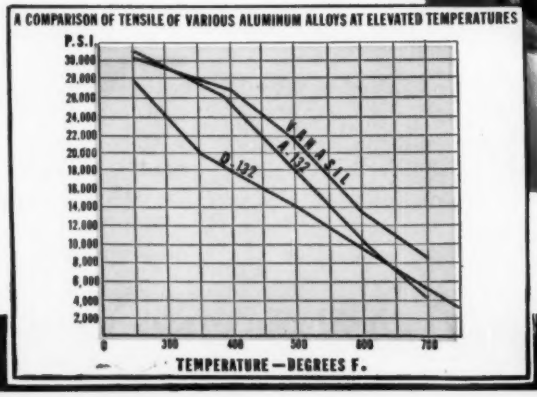
VANASIL Pistons have repeatedly run way over 200,000 miles with only .002" to .005" wear on the top ring grooves. On-the-road ring breakdowns caused by badly worn grooves are almost eliminated because *Vanasil Pistons reduce top ring groove wear up to 75%!* Nothing else compares with the genuine G & E Vanasil—the original Hyper-eutectic silicon alloy, proven by 19 years of use.

You Get ALL These Advantages Only In

GENUINE VANASIL PISTONS

G & E PROVED Hyper-eutectic Silicon Alluminum Alloy

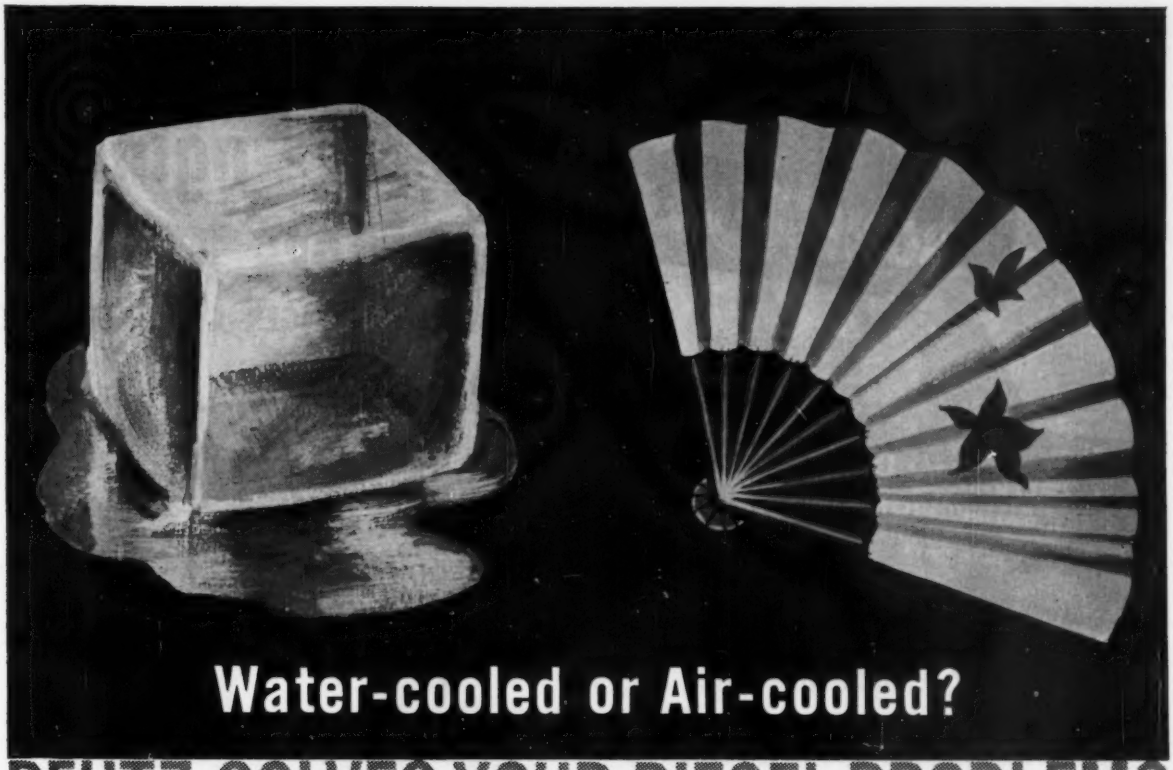
1. LIGHT WEIGHT—Same as other aluminum alloys.
2. SCORING, SCUFFING MINIMIZED—Because of "Oil Absorbing" microscopic porous texture.
3. LONGER LIFE—30% less friction—30% harder. Greater "hot strength"—see chart at right.
4. TOP RING—Breakage virtually eliminated because of reduced ring groove wear.
5. LOW EXPANSION—Characteristics of Cast Iron.
6. CLOSE CLEARANCES—Fitted with Cast Iron Clearances.
7. SOLID SKIRT DESIGN—No expansion devices required.
8. HIGH HEAT CONDUCTIVITY—Similar to other aluminum alloys.
9. PLATING—No tin or other break-in coating required.



Write for complete information and prices on Gillett and Eaton's Wire Insert and Vanasil longer lived pistons.

"Our 91st Year"

GILLETT and EATON, Inc. 846 DOUGHTY STREET LAKE CITY, MINNESOTA

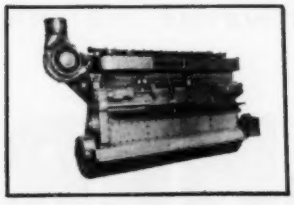


DEUTZ SOLVES YOUR DIESEL PROBLEMS WITH A FULL LINE OF BOTH!

WATER-COOLED

Rugged, low in fuel consumption, Deutz water-cooled Diesels are standard equipment the world over in power plant after power plant . . . ship after ship!

In fact, wherever maximum efficiency, dependable power and economical operation are a must, Deutz has the perfect water-cooled engine. You can choose from two and four stroke diesels ranging from 3 to 2000 BHP in 2, 4, 6, 8, and 12 cylinder models—including a V series and models equipped with exhaust turbo-chargers which increase engine output up to 100% without adversely affecting engine life. In the VM series, you can have gas as well as dual-fuel engines.



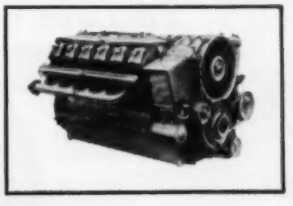
On land or sea, if you've a job for a water-cooled diesel, Deutz has the engine for you . . . even a complete line of diesel locomotives. Service and parts are available everywhere!

AIR-COOLED

The world's leading manufacturer of air-cooled Diesels, Deutz has its engines working wherever a prime mover is required!

These engines deliver full power output in less than 5 seconds from start . . . operate at top efficiency in temperature extremes ranging from −40° to +140° F. Thanks to the Deutz-L'Orange combustion design, there's never a starting problem and many different grades of fuel can be burned. Fuel economy is always outstanding.

Whether you need them for construction equipment, mining, farming, electric generators or marine use, you can have Deutz air-cooled Diesels ranging from 7-250 BHP—available in 1, 2, 3, 4, 6, V6, V8, and V12 models. They'll serve you efficiently, economically, *and for longer than you ever thought possible!*



DEUTZ

DIESEL ENERGY CORPORATION

82 Beaver Street, New York 5, N. Y.

#1 Piston choice of Diesel Engine Builders KEEPS ENGINES POWERFUL LONGER–AT LOWER COST

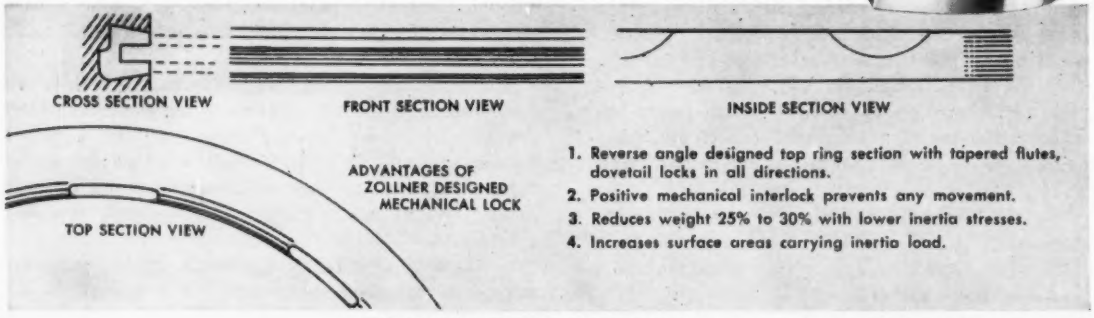
BOND Z LOC

Exclusively DOUBLE BONDED
"Ni-Resist" IRON TOP RING SECTION
METALLURGICALLY A1-Fin Process
MECHANICALLY Zollner Lock

Design adaptable to any type pistons

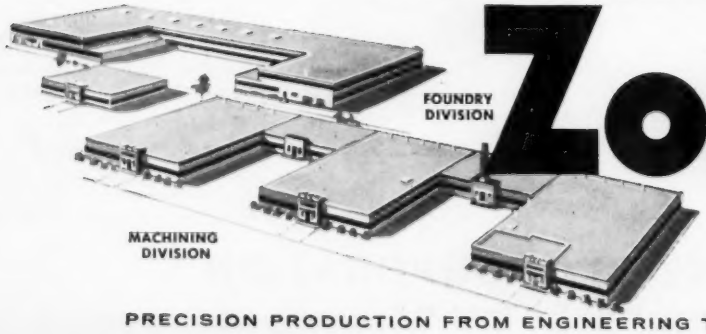
Stops Ring Groove Wear

Everywhere, engine builders and transport operators enthuse over the performance of Zollner Bond-O-Loc Pistons — "The greatest mileage piston we have ever used. Top ring groove wear problems are eliminated by the 'Ni-Resist' Iron section **permanently** incorporated with the double bond of both A1-Fin metallurgic **and the exclusive** Zollner mechanical lock." For longer piston life, better performance and lower maintenance cost, we suggest your immediate test of Bond-O-Loc advantages.



1. Reverse angle designed top ring section with tapered flutes, dovetail locks in all directions.
2. Positive mechanical interlock prevents any movement.
3. Reduces weight 25% to 30% with lower inertia stresses.
4. Increases surface areas carrying inertia load.

ZOLLNER CORPORATION • FORT WAYNE, INDIANA



ZOLLNER
HEAVY DUTY PISTONS

PRECISION PRODUCTION FROM ENGINEERING TO FOUNDRY TO FINISHED PISTONS

diesel power

editorially speaking

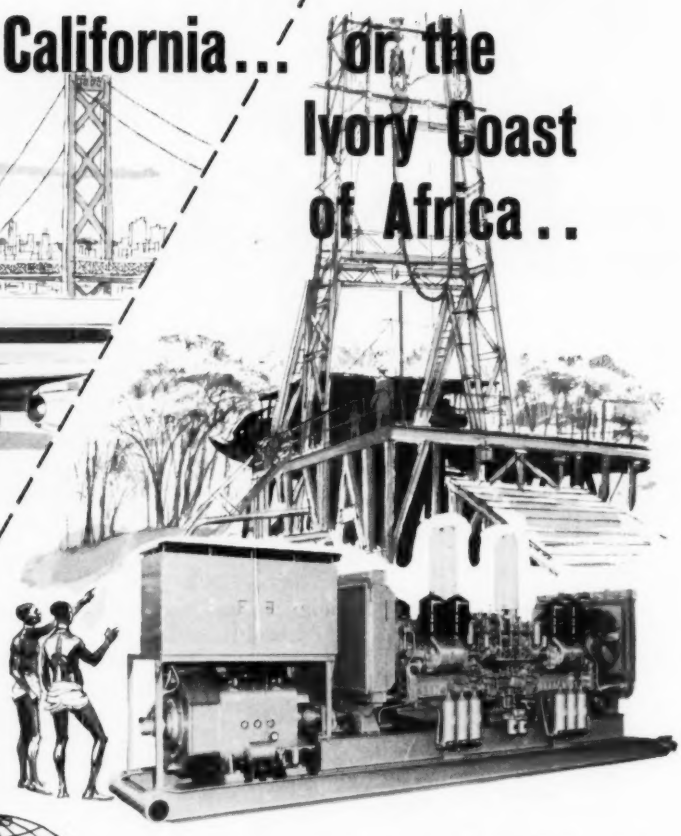
Something to push for . . .

In this issue we are heavy on light-load, short-haul trucking and truck repowering. Why? Simply because it appears to be one of the most promising and hottest market areas for diesel sales. And as far as light-load, short-haul goes, it's a new land to conquer. A couple of years ago, those of us that saw the potential and believed in it were regarded as perhaps sincere but none too bright visionaries. It couldn't happen . . . economics were against it . . . this and that stood in the way. Fact is that some still don't or won't see that something big for the industry is underway. How big? Would you say that a 100% increase in diesel engine production was big? It could be. Trucks produced yearly in the over-6000-lb class, less the bigger ones, already diesel, total about 350,000 units. Let's say that there are about 150,000 registered taxicabs. Total truck registrations run about 11,500,000 units of which roughly half are above 6000-lb. Now, a 10% penetration in new truck production over 6000-lb; a 10% penetration into taxi fleets; and 3% penetration into existing trucks through repowering would double total diesel production in this country! It may not come in a year . . . but it's coming. Indicative of the interest of some engine builders, see results of a phone survey in "Highlights". Impact on truck builder's thinking? Read Mr. Klinge's article. Here's one of the Big Three that's looking at diesels seriously. And they've got actual units on test too. Feasibility? Results? Read how St. Cuthbert's in Britain find that diesels both work and pay off in sizes down to ¼-ton vehicles. "Plus" business? Read the repowering article. Truck transport is big and is getting bigger. No single field of diesel application offers the same growth potential; the numbers alone are staggering in terms of current diesel production. Wonder why some people, including ourselves, are excited? And some, at all levels of our industry, are not. We'd like to convert these. The more people promoting this bright concept, the sooner it will mature. Everyone has a stake in building a bigger industry . . . manufacturers . . . suppliers . . . customers. Not interested in trucking? You've still got a stake. Affects of increased production will have far-reaching influences—on cost, for example—in practically every field of diesel application. So let's all get behind it and push.

B. P. E.

In San Francisco, California... or the Ivory Coast of Africa..

Stewart & Stevenson Self-Propelled, diesel powered, Airport Utility Unit providing electric power for a giant Boeing 707 Jet Liner.



Stewart & Stevenson RIGELECTRIC engine electric power unit supplying power for drilling operations on Laughlin Porter's oil drilling rig in Africa.

STEWART & STEVENSON

When it comes to diesel or gas engine power, Stewart & Stevenson experience and "know-how" have no boundaries.

Here again are two diesel engine power applications . . . in direct contrast and in opposite parts of the world . . . with one important characteristic in common: both were designed and built by Stewart & Stevenson Services, the world's largest distributor of diesel engines. Both power applications are serving vital industries where thousands of dollars and valuable contracts are totally dependent on the reliability and performance of this engine driven equipment.

When you need power . . . for any application in any part of the world . . . Stewart & Stevenson's experience, service organization and engineering will guarantee dependable performance. We will be glad to study your power needs and submit recommendations. Please write for additional information.

STEWART & STEVENSON

STEWART & STEVENSON SERVICES, INC.

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THE WORLD'S LARGEST DISTRIBUTOR OF DIESEL ENGINES

diesel power news section highlights

ROUNDUP REPORT—SOME ENGINE BUILDERS' LIGHTLOAD-SHORTHAUL PROGRAMS

CUMMINS . . .

Cummins plans big lightload-shorthaul promotion breaking sometime next month. Advertising backed up by dealer promotions . . . and complete new bevy of sales brochures. Backbone of promotion will be Cummins LL-SH application success stories—they'll run gamut from airline washer trucks to garbage trucks . . . from dumpers to fleet pickups. They've experimental installations in bread trucks . . .

DETROIT DIESEL . . .

Word from DD is that conversion kits are bringing repowering costs down—way down! Kits for Series 53 have trimmed conversion costs on Chevrolets, GMC and Ford trucks from former figure of $700 to $900 down to neighborhood of only $200 to $300 average! DD expects their distributors to have a 100 per cent increase in sales during coming year in small LL-SH engines. Expects their distributors' LL-SH sales will "with any luck at all" equal last years industrial and marine sales! DD plans to offer their Series 53 installed as original equipment in the near future. DD taking a careful look at school buses . . . with the "3-53" in mind.

HERCULES . . .

Herk has engines (6-cyl 298, 4-cyl 226) out on evaluation in Norwalk Truck's Whites, chalking up over 1300-mi a week in LL-SH type operations. Making a good showing, performance-wise and economy-wise. Others out for experimental evaluation with Motor Cargo on a peddling runs . . . others going into Reo's, Ford 600's, Dodge's, Divco's. Arrangements now being completed for New York City installation, side-by-side comparison between gasoline and diesel. Conversion kits are rolling out of Hercules—one for 22 Series Rio, for the 600 Fords, 600 Dodges, for GMC's. More on way.

INTERNATIONAL HARVESTER . . .

I-H's 301 going into trucks now. First lot of 50 installed in fleet ("where diesel hadn't been before and a lot of people doubted whether it should") are showing excellent fuel economy . . . fleet owners pleased as punch. I-H starts production on their new D 166 4-cyl, 60 hp engine soon. Possible use for OEM taxi cabs.

PERKINS . . .

There won't be a gasoline-powered taxicab left in the country come 2 years if Perkins has anything to say about it. Perkins' 203 powers the new Kalamazoo Checker shown to National Association of Taxiowners annual maintenance meeting in Detroit this month. NATO members got a chance to ogle as well as slip behind the wheel. This Perkins-powered Kalamazoo Checker is available with Borg-Warner automatic or standard transmission. One operator reports, "It's a dream to drive!" An Eastern operator has already placed an order for 50. Perkins-powered Dodge Dart (now available through all authorized Chrysler dealers) has just completed an 8000-mi swing around country, showing its stuff in some 36 cities. Report is it's pickup is every bit as good as gasoline automatics . . . and almost as good as gasoline stick-shift jobs.

HIGHER PERFORMANCE WITH SMALLER TURBOCHARGERS

AiResearch's new line of high performance turbochargers gives higher air pressures and more flow per size and weight than ever before achieved in the turbocharging industry, while retaining the high standards of durability which AiResearch established in this field.

Designed for the 50-700 hp engine range, the turbochargers incorporate (a) low inertia, low stress, high pressure ratio impellers and turbine wheels, (b) free vortex turbine housings which eliminate nozzle rings and provide higher turbine efficiency.

Other advantages:

Lower Cost—Radically simplified design and high production tooling have significantly lowered unit cost and service requirements.

Faster Response—Lowered inertia of the rotating group has made response almost immediate.

Greater Versatility—Interchangeable compressor components for each basic turbocharger housing permit a perfect matching of turbocharger to the job; and better engine matching further reduces operating cost.

These new, high performance turbochargers are readily adapted to AiResearch turbocharger control systems which insure optimum engine characteristics over the entire range.

World leader in the development and manufacture of lightweight turbomachinery of all types, AiResearch now has more than 35,000 turbochargers in the field delivering nearly 9 million turbocharged horsepower.

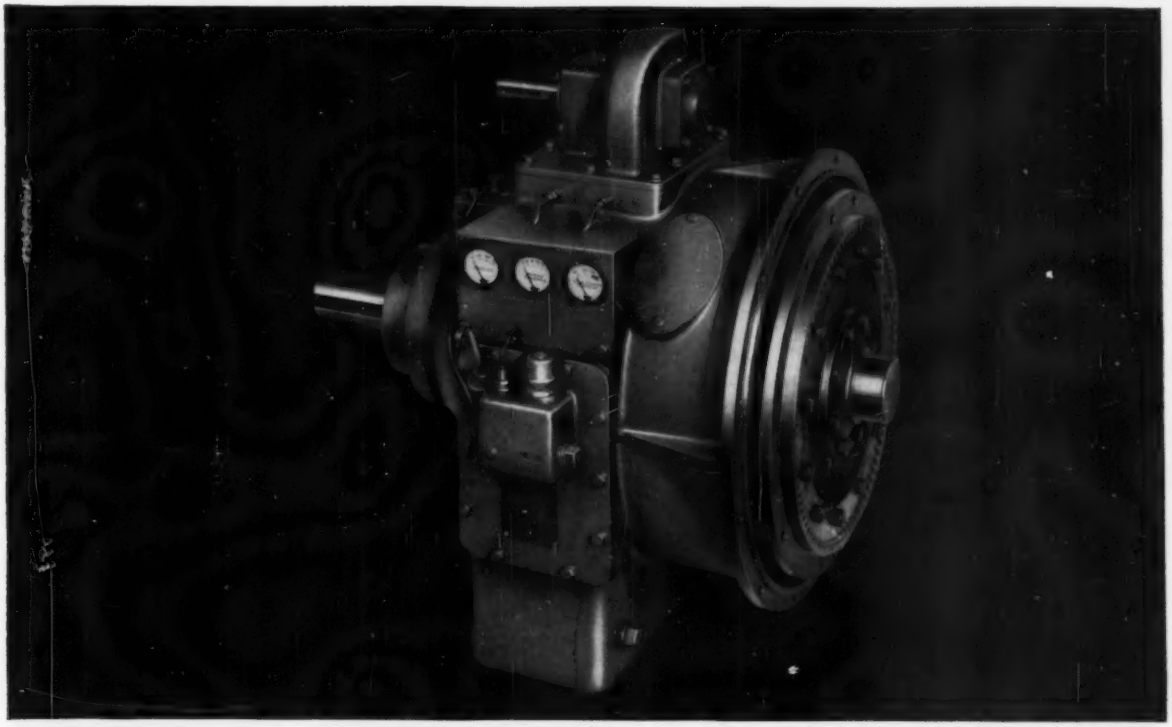
Your inquiries are invited.

THE GARRETT CORPORATION

AiResearch Industrial Division

9225 South Aviation Blvd., Los Angeles 45, California

DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND SPECIALIZED INDUSTRIAL PRODUCTS



From CLARK
A VERSATILE SERIES of
TORQUE CONVERTERS

Three wheel sizes: 14", 15", 16"

Four power absorption ranges

For engines of 40 to 300 hp

- Each of these Clark torque converters has self-contained hydraulic circuits. No troublesome plumbing; no oil leakages.

- All major components are self-contained, easy to remove, easy to service.

- New design eliminates alignment problem between torque converter and engine.

- Four output options
  - Basic unit less end
  - Industrial output (shown)
  - Reduction box output
  - Five-speed transmission
- Many other options
  - Disconnect clutch
  - Clutch controls: manual, solenoid or air activated
  - Overspeed unit
  - Output shafts
  - Reduction drive
  - Integral governor drives
  - Auxiliary power take-off
  - Transmissions

- This series of Clark Torque Converters fits power plants in the 40 to 300 hp range—diesel, gasoline, natural gas, LP gas, electric—intra-city and off-highway trucks, construction machinery, locomotives, farm equipment, logging and oil drilling rigs, ski lifts, industrial drives. All Clark Torque Converters in this series have the same exterior dimensions, all fit SAE No. 1 flywheel housing, SAE type 14" industrial flywheel.

CLARK® EQUIPMENT

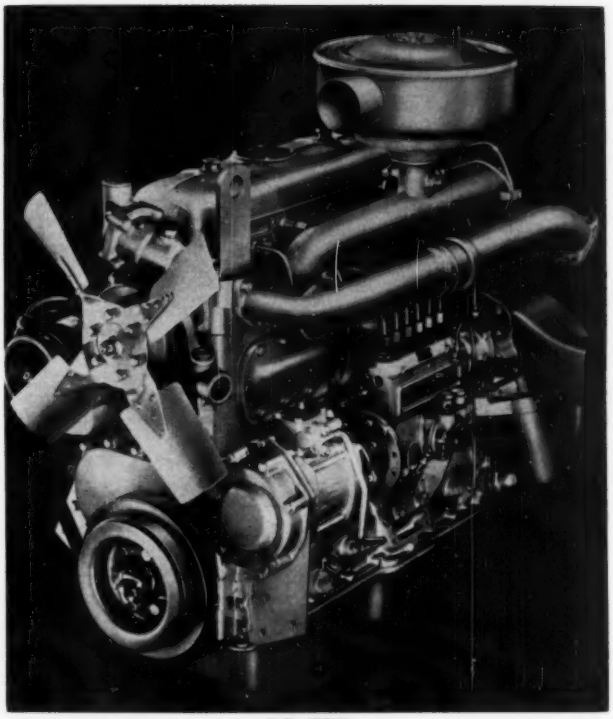
For free catalog, clip this coupon and attach to your letterhead

CLARK EQUIPMENT COMPANY

TRANSMISSION DIVISION, JACKSON 11, MICHIGAN

diesel power news section

Dutch Diesel Makes Its Debut . . . U. S. gets its first look-see at a new 6-cylinder diesel from Holland this month at the International Automobile Show in New York City. Built in the Netherlands by Van Doorne's Automobielfabriek (better known as producer of DAF cars and diesel engines) these new 4-cycle engines will be available in 100, 120 and 165-hp models . . . two of them normally-aspirated, the third turbocharged. Compression ratio is 16:1. New Dutch diesel weights in 1000 to 1200 lb including its standard equipment. Bore and stroke on DAF's DD and DS-575 is 3.96 by 4.75 in and for the DA 475 it's 3.96 by 3.94 in. Built on a modern semi-automated production line (with the resulting economies) this new Dutch diesel has all the earmarks of traditional European craftsmanship, right down to its nuts and bolts. Jan Soeten, president of DAF of Holland, Inc., the builder's American marketing division, sees new diesel's prime target as being trucks, boats and stationary power for industry.



DD-575

Turbos, Turbos Everywhere— and nary an engine to breathe into. But it won't be long before these turbocharger components will be installed on new diesels. It's Garrett's new AiResearch Industrial Division plant in Los Angeles . . . and the high-low truck is moving steel pallet loads of 'em into the machining area.

NEWS ABOUT PLACES, PEOPLE AND PLANTS FOLLOWS ►

Truckers Get Okay On 50 Footers

For the first time in history since the days covered wagons went west, it's now possible for tractor-trailer combinations with overall lengths up to 50-ft to *legally* make the coast-to-coast run. Truckers running the 50-footers won't have to worry about dodging the law—they can make their deliveries and pickups in any state . . . can cross state lines, run in and out of any city. They got the word last month from the Commerce Clearing House. Watch trailer lengths, though, there are still some states limiting maximum trailer length despite the overall length liberalization.

You'll Wonder Where The Smell Went!

People, conditioned to breathing the more toxic gasoline engine fumes all day long, seem very conscious of the least diesel exhaust odor. Perhaps just because it's different. Anyhow, there's a new "diesel deodorant" on the market now. And if it does everything that's claimed for it—well, the diesel's "BO" problem is solved.

Here's how the new diesel deodorant is applied—no roll-on mess, just dump some in your fuel tank. And, presto—"Vitasul" puts "an envelope round the exhaust particles, eliminating their smell." It's also claimed that "Vitasul" improves your engine's performance, reducing fuel consumption by increasing atomization . . . neutralising sulfur traces for longer engine life.

Developed in England, "Vitasul" is being marketed in this country by Ellis Sales Company. Currently, several big outfits are carrying out test programs with this new product.

Hydrostatic Transmission Here In June

You'll get a glimpse at the latest thing in transmissions come June. The "Dowmatic" hydrostatic transmission, a British import, will be demonstrated in New York City's Coliseum early this summer, June 10-26th.

Eric H. Bowers, director and chief engineer for Dowty Hydraulic Units Ltd. of Chelterham, England, claims this new transmission "offers advantages unmatched by any other form of transmission for off-highway vehicles." It's already being used successfully in British road-building equipment . . . diesel locomotives . . . mining equipment . . . and in various industrial drives that are subject to frequent gear changes and direction reversals.

"Dowmatic's" transmission is simplicity itself. No shifting necessary —two hydraulic pipelines are the only link between the engine-mounted hydraulic pump and hydraulic motors driving the wheels or tracks. Means you can get smooth, uninterrupted use of maximum hp at all times . . . at all speeds.

MORE ►

YOUR SHOP CAN *POSITIVELY*

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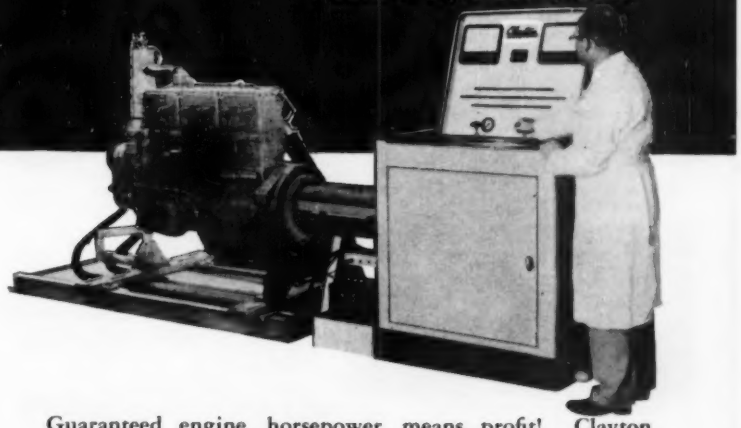
with a Clayton ENGINE DYNAMOMETER . . .

complete with . . .

- Engine Test Stand
- Universal Mounting Adapters
- Universal Engine Cooling System



Guaranteed engine horsepower means profit! Clayton Dynamometers and Universal Test Stands are designed for "run-in" and test of all types of engines and power units equipped with mechanical clutches or torque converters. Quickly and accurately measures actual performance of new or rebuilt engines. Torque loads can be maintained indefinitely or changed at will. Engines installed in minutes . . . automatically aligned.

There is a Clayton Engine Dynamometer to test *Any* Engine

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WRITE NOW . . . for specific information on how Clayton Engine Dynamometer equipment can be used to increase the profits of your particular operation.

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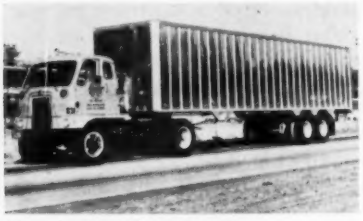
CLAYTON MFG. CO., 423 N. TEMPLE CITY BLVD., EL MONTE, CALIF.

(Continued from page 29)



Here's Another Trucker Converting To Diesel . . .

Atlanta - New Orleans Motor Freight has a 2-year-plan. By 1962 they'll have switched over from 100% gasoline - powered to 100% diesel-powered. They've just received their first 40 I-H DCO-405 truck-tractors to get the conversion under way. Ten more are on the way! These DCO-405's will be powered by Cummins NH-195 engines . . . 5-speed transmissions and 2-speed rear axles with a GCW of 63,280 lb.

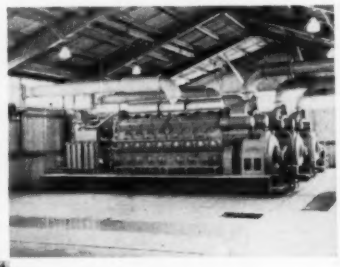
DIESEL POWER PLANTS

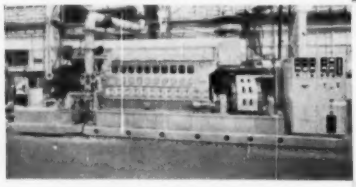
ALTERNATING CURRENT AND DIRECT CURRENT

Save on new and remanufactured units engineered by AGSCO

3000/5000kw STATIONARY PLANT

Turnkey installation for Kermac Nuclear Fuels Corp., Grants, New Mexico, using new GM Electro-Motive Division generator sets, dual fuel. Other diesel or dual fuel plants available in 500, 750 or 1000kw sizes.





1136kw PORTABLE PLANT

Completely engineered and designed for heavy construction and use in remote areas by large utilities.

300kw POWER PLANT ON WHEELS

Assembled as a full trailer unit containing a GM 450hp model 8-268A diesel engine and a Westinghouse 300kw, 375kva electric generator complete with switchgear and radiator. Arrives ready to operate.

A. G. SCHOONMAKER *Company, Inc.*

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OGP, ASME, Conference Kansas City, May 23-26

Final program for the 32nd Annual Oil and Gas Power Division, ASME, Convention to be held next month in Kansas City has been "finalized." Overall theme of the 4-day May 23-26 meeting is to be "Economics of Engine Power." Backing up this theme will be an interesting and informative selection of technical papers, panels and special sessions. Those attending will also have a chance to get the latest up-to-date product information—some 26 companies will be displaying their latest developments.

John C. Gibb, chairman of the OGP executive committee says, "OGP's conference and exhibit is open to everyone who is concerned with any aspect of the building or use of internal combustion engines . . . non-members as well as ASME members are more than welcome."

Remember the date—May 23-26. Remember the place—Muehlebach Hotel in Kansas City. And remember everyone in the internal combustion engine field is welcome.

PC Mushrooming . . .

Perfect Circle is growing right out of their existing plant facilities. They'll be building a new foundry at Rushville, Indiana this year . . . another plant in Richmond . . . and, pointing up the way PC is aiming itself, their research and development staff grew 26% last year alone! PC is growing by leaps 'n bounds on the international scene too. They've purchased Platka Export, Inc. of Fort Wayne . . . formed a distributorship subsidiary in Holland . . . and a new Mexican Manufacturing plant.

Don't Forget . . .

Here's another reminder — the 38th Annual Convention of the Automotive Engine Rebuilders Association is coming up soon. June 1st is the date . . . Netherland Hilton Hotel is headquarters . . . and the city is Cincinnati. Many of those attending are planning to make it a 2-in-1 deal—they'll be attending the Memorial Day race in Indianapolis as well as the AERA convention. Got your reservations yet? If not, there's still a little time.

5000 PSI On stream . . .

Cooper-Bessemer's installation at the Fortier plant of American Cyanamid in Avondale, Louisiana, is achieving pressures with 4-stages that formerly required up to 60-stages. C-B gets 5000 psi with its 4-stage mixed gas reciprocating compressors — pressures jumping from 60 psi to 225 psi from 1st to 2nd stages, 670 psi entering 3rd stage, 1500 psi into the 4th . . . and out at a maximum 5000 psi. They're being used to manufacture anhydrous ammonia—100-million lb annually.

C-B Gets
$5-Million Contract

Cooper-Bessemer will be building 11 new 1500-kw diesel engine-generator sets for the U. S. Army Corps of Engineers. These LSB-12-T diesels, turbocharged and capable of 2120 hp at 327 rpm's, will be providing the precise electrical power needed for the Army's new Zeus anti-missile missile program. Number one requirement, powerwise, was reliability . . . also voltage and frequency fluctuation had to be held to an absolute minimum. These 11 units are being built and tested at C-B's Grove City, Pennsylvania, plant . . . for later installations at White Sands and Kwajalein Island out in the Pacific. It's planned that they'll be all in the operating by this Fall.

Re-Born Panzer's
Powered By Diesels

Recent Winter war games in Bavaria saw U.S. tanks modified with German-made diesels taking an active part. They belonged to the newly reactivated 30th German Panzer Division. Germans have long recognized the advantages of diesel tank power— (1) lower fuel consumption and increased power, making for easier logistics; (2) and tank crews, acutely aware of gasoline's explosive qualities, welcome a switch to safer diesel fuels.

We have long trailed in tank diesel injection but are catching up now. Continental Motors has developed an air-cooled diesel designed to drop right in to the same hull space as former gasoline engines. From all indications, its an excellent package. We can hear the cheers of our tank crews already.

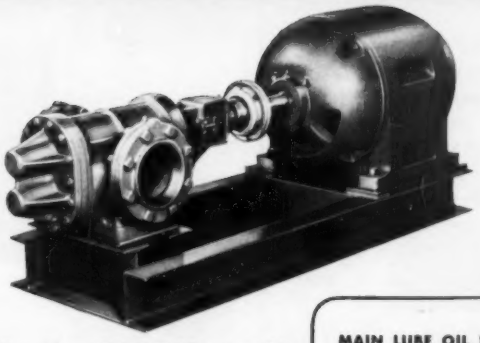
Cleveland Cartage
Buys 50 Kenworths

Cleveland Cartage will be getting the first of its newly-purchased Kenworths this month. Complete delivery—50 in all—will be finished by June. These will be 3-axle, dual rear drive Kenworths powered by Cummins NH-220's. They'll be hauling bulk cement in Ohio and Pennsylvania . . . part of Cleveland Cartage's 2000-unit fleet, one of the nation's most diversified truckers.

(Continued on page 93)

ROPER PUMPS

Complete Pumping Service for the Diesel Field

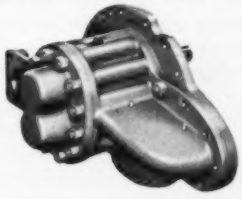


Series 3600 — 40 to 600 G.P.M. up to 60 P.S.I. Packed Box construction, hardened steel shafts, hardened alloy iron pumping gears. Heavy duty bronze bearings.

Series F — 1 to 300 G.P.M. up to 300 P.S.I. Packed Box or Mechanical Seal construction, hardened steel shafts, steel pumping gears, heavy duty flange type bronze bearings.

Series K — 1 to 50 G.P.M. up to 150 P.S.I. Packed Box or Mechanical Seal construction, hardened steel shafts, hardened steel pumping gears, heavy duty bronze bearings.

Custom — Adapting the Roper pumping principle to customer's requirements.



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Before and After Pumps

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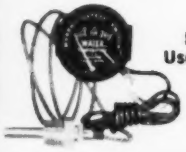
MURPHY

POSITIVE DIESEL SHUTDOWN in the event of trouble!

O-27
User $9.00

OIL PRESSURE SAFETY SWITCH GAUGE
Automatically stops engine if oil pressure fails. Mount on instrument panel or screw into oil line. Visible contacts and pressure gauge in one instrument.



SR-21
User $9.00

WATER TEMPERATURE SAFETY SWITCH GAUGE
Instantly shuts down engine when overheating. Mount on instrument panel or screw into water jacket.

MV-7199
User
$29.50

SAFETY FUEL SHUT-OFF
Valve is manually latched open—electrically tripped. Stops engine when oil or water safety switches operate.

- One instrument is a safety switch and a gauge . . . Does two jobs.
- Gives visual proof it's operating.
- Simplifies installation and inventory.

NOW ORIGINAL EQUIPMENT ON MOST ENGINES.

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diesel power news section people plants

GM's Cleveland Diesel Appointments . . .

Benjamin H. Gommel, general service manager for Cleveland Diesel Engine Division of General Motors has moved up to the newly created job of administrator, special projects. Gommel came to Cleveland Diesel in 1925 as a test engineer. He's moved up the ladder from superintendent of test to assistant general service manager to general service manager.

B. H. Gommel

S. M. Baltes

J. G. Stocker

Sterling M. Baltes has taken over the job of assistant service manager for Cleveland Diesel. Baltes started with CD in 1928. Starting in the assembly department he's moved up from tester and test foreman in the service department to superintendent of installations.

John G. Stocker has just been promoted to service manager. Stocker joined Cleveland Diesel in 1936 working in CD's test department, moved up to supervisor of service and later to assistant general service manager.

E. D. Tull

E. Don Tull Takes Over Presidency

As reported in last month's DIESEL POWER, E. Don Tull is Cummins Engine Company's new president. He steps into the vacant chair left by resignation of R. E. Huthsteiner. Tull, one of Cummins first employees, started as a shophand with the company in 1928.

3 New VPs For Wyman-Gordon

Wyman-Gordon got themselves three new "veeps" last month. Moving up to the vice president slot for W-G is Janes L. Roach, director of marketing . . . Joseph R. Carter, general manager, eastern division . . . Robert E. Zell, general manager of W-G's Ingalls-Shepard division.

GM Diesel Appointment . . .

Gerald R. Holly has been named manager of sales engineering for Detroit Diesel. He's been general supervisor of specifications and price analysis . . . before that he was working out of DD's San Francisco office.

New Plant, New Location For Hancock . . .

Hancock Diesel Service Company has just moved in their modern new plant in Findley, Ohio. Address? 2425 Park Street. They've got more space and more equipment now to take care of your GM injectors . . . recondition those worn plungers and bushings. Hancock uses the new Kent-Moore injector comparators to check out and run-in reconditioned injectors.

KIENE® diesel engine test equipment

Kiene Adapters and Connectors available for all makes and models of diesel engines manufactured in U.S.A.

1. **Model KTP-50, Hydraulic Test Pump . . . designed for field service . . . portable . . . no belts or clamps for leverage . . . many novel features.**
2. **Model K-120, Universal Indicator . . . for high-speed automotive type diesels...can be adapted to larger engines for firing pressure readings.**
3. **Model V-10, Indicator Valve . . . rugged . . . will not blow open . . . adaptions for all locomotives.**
4. **Model K-100, Cylinder Pressure Indicator . . . simple . . . accurate . . . for compression and firing pressures on large horsepower engines.**
5. **Model UTS-10, Portable, Universal Unit Injector Test Stand . . . checks all sizes in one fixture.**

Kiene Diesel Engine Test Instruments are recognized throughout the industry for their accuracy and adaptability. They are designed for long service under most severe field conditions. Kiene equipment assures the proper maintenance of diesel engines . . . helps prevent costly down time. Get the facts on Kiene before you invest in diesel test equipment.

Send for Descriptive Literature

KIENE DIESEL ACCESSORIES, INC.
BOX 216, FRANKLIN PARK, ILLINOIS

L. G. Downey

G. W. La Salle

2 New VPs For Hercules

Lawrence G. Downey has moved up to vice president in charge of sales for Hercules Motors Corporation. Downey joined Hercules back in 1940. Recently he's been responsible for Herc's west-coast sales.

George W. La Salle has moved up to vice president in charge of engineering for Hercules. La Salle has been with the company since 1928, mostly in engineering and development work. Recently he's been development coordinator on military engines.

New Tulsa Manager For F-M. . . .

William G. Vollendorf has been appointed manager of the Tulsa sales district of Fairbanks, Morse & Co. Vollendorf succeeds Kirke K. Wyatt, who has been promoted to manager of petroleum industry sales for F-M. F-M's petroleum industry sales headquarters, formerly in Dallas, is now located in Tulsa.

"Fairbanks-Morse is becoming increasingly identified with the petroleum industry," Mr. Wyatt indicated. "F-M is selling engines up to 600 hp for pipelines . . . compressors for the petrochemical industry, turbine pumps for water injection into deep source wells, plus ZC engines for operating oil well pumps."

PC Promotion . . .

William C. Schuster has moved up to fleet engineer for Perfect Circle. Schuster's new territory will include Pennsylvania, New York, New Jersey, Virginia, the Carolinas, Georgia, Florida, Alabama, Maryland as well as the New England states. Looks like Bill will be doing a lot of traveling in his new post.

New Mack Distributors . . .

Mack truck sales are going well. Indication of this is the recent appointment of nine new distributors. These recent distributorship additions will give Mack a more complete sales and service coverage across the country. Here's a rundown on the nine: Abercombie Mack Sales, Carbon Hill, Alabama . . . Vance Morris Mack Sales, Huntsville, Alabama . . . Kern Mack Sales & Service, Bakersfield, California . . . Truck Sales & Service, Waterbury, Connecticut . . . H & H Truck Sales, Evansville, Indiana . . . Grand Traverse Tractor Company, Traverse City, Michigan . . . Motor Service Company, Farmington, New Mexico . . . Mack Truck Sales of Tulsa, Tulsa, Oklahoma . . . Westmoreland Mack Sales, Irwin, Pennsylvania.

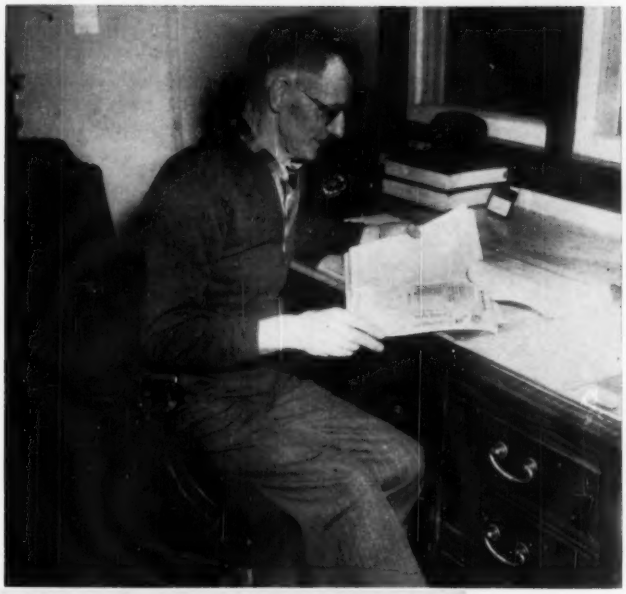
Voyce-Legier Gets Maxim Silencers . . .

Voyce-Legier, Inc. of Miami will be handling the Maxim line of industrial silencers in Florida. Appointment as sales representative for Emhart Manufacturing Company's Maxim Division came last month.

(Continued on page 89)

Today's Diesel Man

story and pictures by
Walter Rudolph



Wintertime is repairtime at Horvitz's shop.

"George Swailes knows as much as anyone can know in our organization about diesel-powered equipment, and diesel engines. He has a background in this diesel field of about 35 years. His responsibility covers keeping all our many pieces of diesel equipment in good running order and repair."

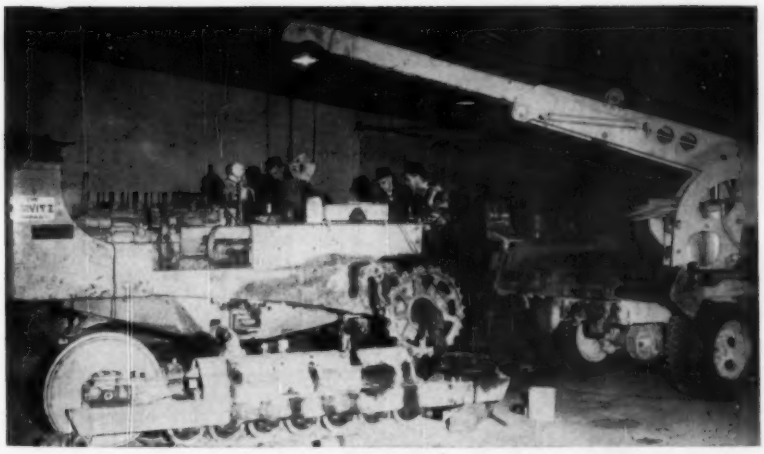
Leonard Horvitz, President,
The Horvitz Company
4393 E. 146th Street
Cleveland, Ohio

Back when the first Caterpillar diesel dozer was a thing of wonder in the Cleveland construction field, George Swailes, of the Horvitz Company was one of the men who wondered the most—because he soon found it his responsibility to find out what made the Cat tick, and how to keep it running.

"That was about '35 or '36," Swailes recalled a few weeks ago. "Oh, I was in construction before that, but we were just then beginning to look around and feel the need for something that had it over gasoline power—something that could give us power, stability (and take all the rough treatment you give it in construction) and still come back for more without falling apart. As always, economy was the big factor."

Today George Swailes, who is described by Leonard Horvitz, president, Horvitz Company, as his "diesel man," takes charge of from 40 to 50 pieces of heavy diesel equipment for this firm. In this inventory you'll find the usual kinds of equipment popular in road construction, bridge building and asphalt paving. Swailes describes Horvitz Co. as "one of the biggest" contractors in northern Ohio. What jobs has Horvitz finished in recent months? Some of these are the freeways, or sections of freeways, in northern and central Ohio: near Painesville, Ohio, and Mentor, Ohio. The contracts have run in the two-to-three-million-dollar class. These big jobs require big equipment—and equipment that's got to be in top operating order.

"We have Cat, International, GM and Cummins diesel engines throughout our dozers, trucks, crawlers, scrapers, cranes, rollers and asphalt plants, used year in and year out," Swailes reported. "We know 'em all, and like what they do, depend on their reliable performance."



Austin-Western crane helps ready big "Cat" D-8 for Spring 'n Summer road building work that's ahead.

Complete Records . . . . Key to Control

What about keeping this huge pool of powerful equipment "in the black," or earning its keep? Swailes answers that he has evolved his own method of record-keeping that seems to satisfy everyone concerned. It begins the moment a new piece of diesel equipment is purchased.

"We take the operating literature, brochure of whatever we get, and start a file on that new unit," he explained. "This file folder is then pulled out whenever any question about the new unit comes up, or any kind of work whatsoever is undertaken on that unit—from routine lubrication, scheduled checkup, replacement of rings, valve-grinding, painting and so forth.

"Every invoice against that piece of diesel equipment also goes into the 'private' folder or file on that unit," he continued. "This gives you a history on everything. Just go to the file and pull out the folder and answer any question about hours run, repairs made, parts replaced, and your costs. You have to do this sort of thing to make sense in diesel maintenance."

Wintertime is worktime too!

At the time of our interview road-building was slow. And George Swailes was taking advantage of it—busy out in the shop supervising his men who were taking the transmission out of a Cat D-8, getting it ready for the Spring and Summer work ahead. Near at hand, in the Mentor shop, another similar machine was having repairs made on its final drive.

Ronald Horvath is dieselman Swailes' righthand man. Here he's checking out D-8 rod for "Cat" diesel dozer engine.

"If a diesel man in construction knows anything, he knows that the scheduling of work on diesel equipment is very erratic," Swailes told us. "Jobs are as varied as they can be, from one week, or even one day to the next. This affects equipment condition and type of work load. This week we might be welding all over the place, but next week we may be tearing engines apart, or gear cases, or wheels. You have to adjust to the conditions of the moment and also take advantage of slack periods to get equipment in shape."

Parts inventory—the fleet's "Blood Bank"

What about stocking of parts for diesel equipment, how much of it is done, what pieces are considered critical?

Swailes tells us that Horvitz has learned to adjust its inventory of diesel parts to market conditions, as much as feasible. When a study of industrial conditions as a whole indicates that certain parts might be scarce within a month or so, Swailes is authorized to purchase these certain parts in sufficient quantity so that a shortage during completion of a contract won't occur.

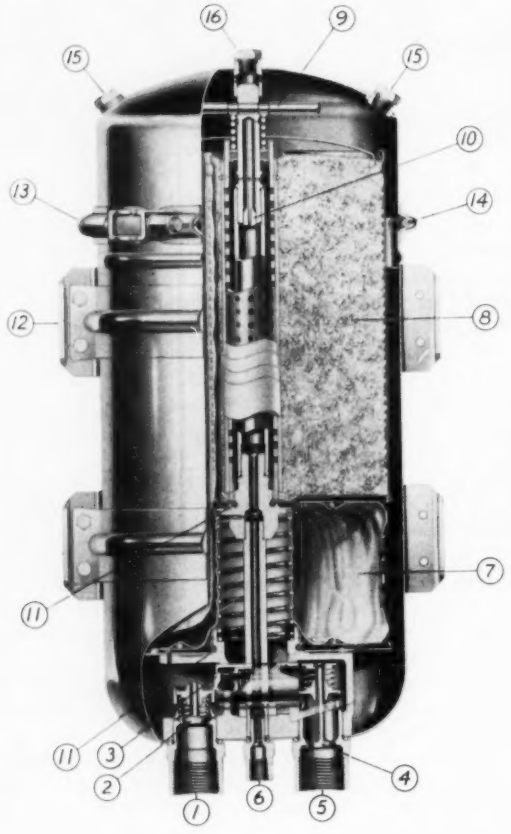
"Depending upon availability," Swailes commented, "you'll usually find our diesel parts in plentiful numbers in our many stock bins. Pumps, injectors, pistons, bearings, valves, maybe crankpans—any diesel man knows how it goes—are ordered depending upon the situation at hand.

He Does The Shopping . . .

Swailes does much of the purchasing and recommends purchasing with management on everything from wire rope to lubricants in his job as this firm's diesel authority. Because of this, he likes to keep up on techniques—likes to keep informed about the diesel power industry and the latest developments in road-building, paving as well as anything that borders on his big job of maintaining big, expensive machines.

"You can talk all you want about *what to buy*, or *what equipment should do on the job*, or how to take something apart and fix it," Swailes philosophizes, "but when you come right down to it, I find it's the man who's actually closest to the job—actually has his hands in there—he's the fellow who has the real answers today. Being a diesel man is being a student all your life, I guess. It's an interesting job . . . and I like it!"

Full-Flow / By-Pass Lube Filtration With Single Filter Element...



LUBER-FINER DULEFLOW FILTERS
DETAILS & FEATURES

1. Full-Flow Inlet (1" N.P.T.)
2. Inlet Check Valve
3. Full-Flow By-Pass Valve
4. Outlet Check Valve
5. Full-Flow Outlet (1" N.P.T.)
6. By-Pass Outlet (1/4" N.P.T.)
7. Full-Flow Element (45-micron fabric bag)
8. By-Pass Element (Dieselpak)
9. Spring-Loaded Element Hold-Down
10. By-Pass Metering Orifice
11. O-Ring Pack Seals
12. Heavy-Duty Mounting Brackets
13. Single-Bolt Cover Clamp
14. O-Ring Cover Gasket
15. Filler Plugs
16. Vent Plug
17. Drain Plugs (Not shown)

A unique 2-in-1 filter now available from Luber-Finer combines both full-flow and by-pass filtration protection in a single compact unit. "Duleflow's" easier servicing should certainly make maintenance men everywhere smile and heave a welcome sigh of relief. One filter housing and one element do the whole filtering job.

Changing elements is a cinch—just remove your old element and screw in a new one. Seals are semi-permanent and re-usable. And for simpler handling, both elements have been fastened together at the factory. Means you pull 'em out as a unit . . . and put 'em in as a unit!

Here's how "duleflow" works . . . .

"Duleflow" is constructed in two sections—not just another so-called dual-purpose element, but actually two truly separate and independent filtering circuits within one filter housing.

"Duleflow's" full-flow section consists of a heavy-weight cotton-twill fabric bag that filters your full-flow oil stream to approximately 45 microns. All oil flow passes through this element before going to the engine bearings and other pressure-lubricated parts. This fabric bag handles a flow rate of 20-25 gpm of hot engine oil at a pressure-drop of only approximately 5 psi.

"Duleflow's" by-pass elements consists of regular Luber-Finer DIESELPAK. This section of the filter takes off approximately 10% of the full-flow oil stream and returns it filtered to the oil pan. Thus, Luber-Finer's new "Duleflow" filter combines the benefits of the regular DIESELPAK filter—plus, you get the added protection of a simple but efficient 45-micron full-flow filter. And it's all in one compact unit that's easy to service.

Interesting Engineering Features . . . .

"Duleflow's" inlet and outlet fittings are all located in the bottom of the filter housing. They're equipped with spring-loaded check valves to prevent the filter from draining out after shut-down. This means that your bearings are assured of oil when the engine is re-started.

Should the full-flow filter bag ever become plugged and overloaded, dual by-pass valves permit the oil stream to by pass directly from inlet to outlet of the filter. These safety valves are set to open at a pressure differential of 15 psi. Normal pressure drop across the full-flow bag rarely if ever exceeds 5 to 6 psi. This has been found to be true even after 6000 to 8000-mi of service.

Luber-Finer's new "Duleflow" filter has been extensively tested on several makes and models of diesel trucks during the past year. Quite a number are already in use in various parts of the country. Everybody—especially maintenance people—are happy about this new 2-in-1 filter.

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with new, easy-to-read GLO-POINT indicator

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MAIL TO

BARBOUR STOCKWELL INSTRUMENTS
80 CAMBRIDGE ST., WORCESTER, MASS.

This Reliance Tachometer has been reproduced actual size so you can try it on your layouts, blue prints, or instrument panels. Note how easy it is to read with the new GLO-POINT Indicator and QUICK-VISION Scale. Detach and try it out right now! See for yourself how this sturdy new Reliance Tachometer fits your installation!

IF YOU'RE AN ENGINE OR EQUIPMENT BUILDER . . .
IF YOU SELL OR DISTRIBUTE DIESELS . . .
IF YOU OWN, OPERATE OR MAINTAIN DIESELS . . .

YOU WILL LIKE THESE RELIANCE FEATURES

Non-magnetic . . . weather resistant . . . custom-made to fit your installation . . . individually hand calibrated . . . accurate to within ½% . . . rugged, simple design unaffected by temperature variations . . . built by America's oldest tachometer manufacturer. Reliance quality assures you of fewer costly service calls . . . Reliance accuracy assures you of longer intervals between equipment overhauls.

Reliance allows you to operate at peak efficiency . . . Reliance provides all the performance you are paying for.

Specify Reliance for the finest in tachometers . . . you'll find it pays to "Rely on Reliance"!

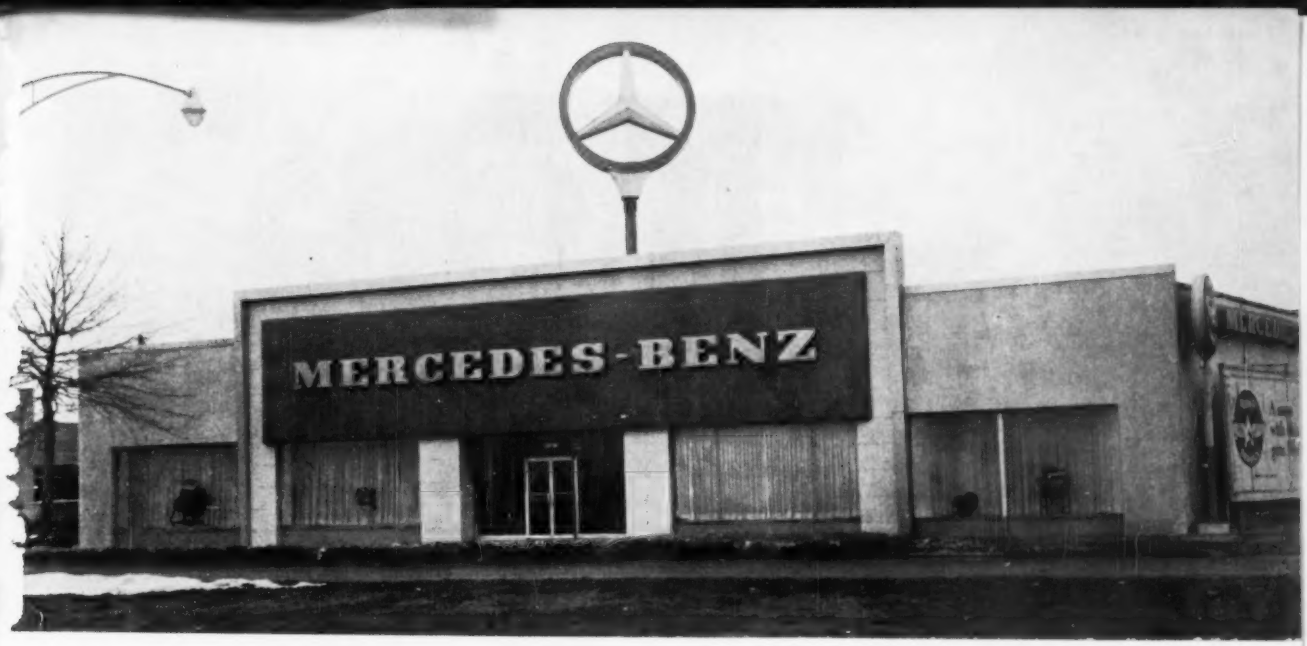
BIS

BARBOUR STOCKWELL INSTRUMENTS

A DIVISION OF CURTIS & MARBLE MACHINE CO.

80 CAMBRIDGE STREET, WORCESTER 3, MASSACHUSETTS • PLeasant 5-3135

Manufacturers of Indicating, Recording and Transmission Products for Industry



Mercedes Benz Sales / Service Program Shifts Into High Gear . . .

Daimler-Benz of North America will now market Mercedes-Benz diesel engines in US and Canada. Sales efforts will be backed up by engineering and technical service, parts and maintenance.

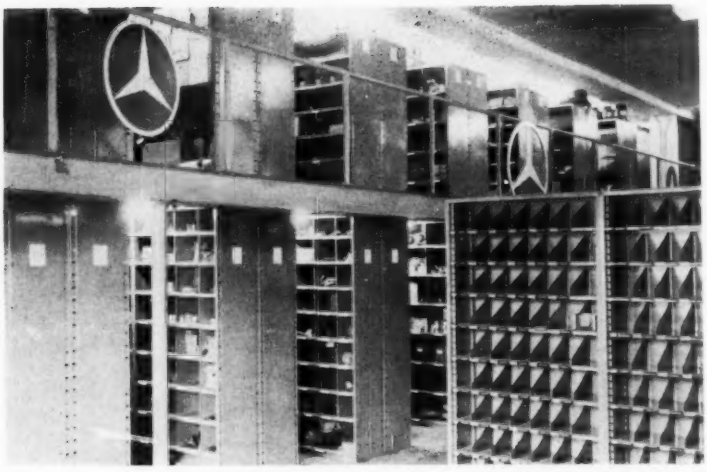
Daimler-Benz of North Amcrica, Inc. has taken over import, sales and service responsibility for Mercedes-Benz diesels and large diesel buses in the United States and Canada. This organization, a wholly-owned subsidiary of Daimler-Benz A.G., Stuttgart, Germany, took over last November. Formerly, the Utica (Michigan) Division of Curtiss-Wright Corp. held the franchise for import and sale of these engines. The change was made by mutual agreement. Distribution groundwork laid by Curtiss-Wright will be the nucleus of the Daimler-Benz merchandising organization.

Daimler-Benz A.G. is certainly no new-comer to either the diesel or vehicular fields. And in addition to their industrial and marine diesel applications they were one of the first to combine the diesel and vehicular fields. They were first on the market with diesel trucks in 1922 . . . first introduced diesel passenger cars in 1936. Since World War II, D-B A.G. has produced over 125,000 diesel cars.

Evidence of this is seen in the growing number of their 180D and 190D cars on American streets, both as taxicabs and in private use. Mercedes-Benz diesel buses are now used for inter-airline service at Idlewild International Airport. An industrial version of the same engine used in the 180D has made good penetration in the refrigerated tractor-trailer field. A substantial number of installations have been made, first by Sterling Refrigeration Company of Omaha, and later Thermo-King Corp. of Minneapolis in heavy-duty trailer refrigeration units and reports show excellent performance.

Alfred Carroll, General Manager

Backing up the American organization are the substantial facilities of Daimler-Benz A.G. They reported



Newly finished bins are ready for stocking . . . will hold a complete M-B part inventory.

sales of over $800-million for 1959, including Auto Union GmbH that manufactures DKW vehicles. This group, with 11 assembly units outside of Germany, employs 82,000 persons.

People make things move . . . .

Daimler-Benz of North America, Inc. was established in New York in April 1955 to survey the American market for Mercedes-Benz diesel engines, buses and trucks. The present program, according to Mr. H. C. Hoppe, vice president of D-B N. A. Inc., is "to establish a solid market basis for Mercedes-Benz diesel engines in North America based on quality and service." Mr. Hoppe is aware of the highly competitive field they are entering but feels that the widely-known Mercedes-Benz name and recognized product quality will greatly assist them in developing the American market.

Under Mr. Hoppe's direction the Industrial Division of D-B N. A. Inc. has been formed with headquarters at

Edward R. Paterson, Sales Manager

126-56 Northern Blvd., Flushing, New York. Sales and service of Mercedes-Benz diesels will be handled through this division under Mr. Alfred Carroll as general manager. Edward R. Paterson is sales manager.

Alfred Carroll comes to D.B.N.A., Inc., from General Motors. He was Senior Project Engineer with the Cleveland Diesel Engine Division from 1953 to 1956 when he transferred to G.M. Overseas Operations to serve as Product Distribution Specialist. Carroll received his education at Manhattan College and the Naval Reserve Officers' Training Program, later serving in the European, Pacific and Asiatic theaters as naval line officer during the war. He holds the rank of Commander in the U.S.N.R. and a degree of Bachelor of Engineering from the University of Western Australia. He took up his duties with D.B.N.A., Inc. February 16, 1960.

Sales Manager Edward R. Paterson was also lately with GM Overseas. He has a long career identified with diesel engine sales and application engineering in both the industrial and marine fields. Later he aligned with the GM Dealer Organization handling Detroit Diesel sales and application engineering. Here, he won the Detroit Diesel Crowe Award for top sales in three consecutive years. From 1956 until joining D-B N.A., he served with the Power and Industrial Section of GM Overseas Operations.

The Industrial Division is staffed with both D-B A.G. factory-trained and U.S. industry-trained personnel, selected for their experience and training in specific fields. Major functions are sales and service but these can be further broken down. For example, in the area of sales there are OEM accounts and also dealer/distributor sales.

Mr. Paterson stated that "While we want to build a complete sales organization as quickly as possible, first things come first. We want to build soundly. Preliminary emphasis will be on present OEM accounts, those pending and new ones. Then we'll bolster our dealer/distributor organization. Right now we have the nucleus of a distributor organization set up by Curtis-Wright. Additional distributors and dealers will be selected on a long-range program with the ultimate objective of providing wholly adequate sales, service and parts facilities to all owners and users of Mercedes-Benz engines everywhere."

Mr. Carroll added, "Regional managers will be strategically located with full authority to handle both OEM and dealer relations." He then went on to describe their other facilities to back up sales and insure satisfied customers.

"We have an engineering staff to work on application and design problems associated with installation of our

(Continued on page 94)

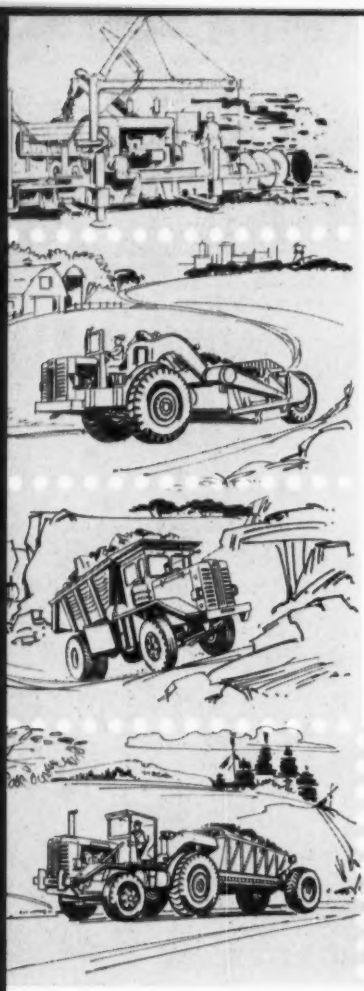
There is a Woodward Hydraulic Governor for every internal combustion engine application. Our ninety years of experience in the governing field is available throughout the world. Write for complete information on all Woodward Hydraulic Governors.

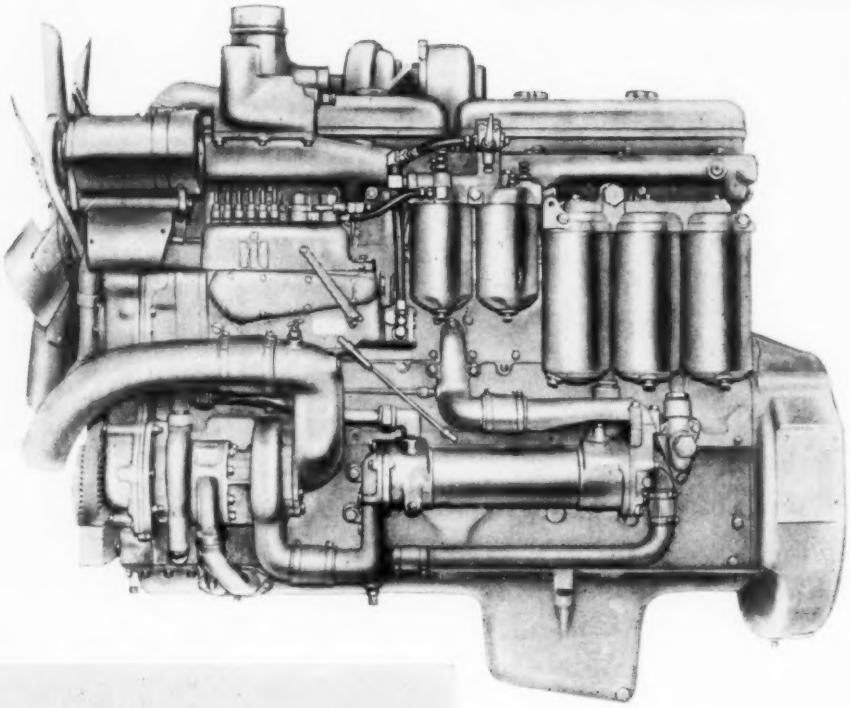
WOODWARD SERVICE

WOODWARD GOVERNOR COMPANY · ROCKFORD, ILLINOIS

THE WORLD'S OLDEST AND LARGEST MANUFACTURER OF HYDRAULIC GOVERNORS EXCLUSIVELY

Fort Collins, Colorado • Schiphol, The Netherlands • Slough, England • Tokyo, Japan





NEW UDT-817 DIESEL is a 4-cycle turbocharged engine with 817 cu. in. displacement and max. torque of 1,040 lbs. ft. @ 1,400 rpm.

New power, performance and price leader in the 385-hp diesel class

Here are three fast facts about the turbocharged, new direct-start, direct-injection International 6-cylinder UDT-817 diesel that can mean big savings powering your equipment:

POWER—The UDT-817, developing 385 hp., leads the field in its size class.

PERFORMANCE—The specific fuel consumption of the UDT-817 is the lowest in its size class.

PRICE—The UDT-817 is the lowest priced engine in its size class in dollars per horsepower.

A wide variety of accessory equipment including air cleaners, flywheels for leading makes of torque converters and clutches, torque converter cooler, air control compressors, safety shut-offs, instruments and engine controls can be furnished to meet your installation requirements. Base, radiator, hood and dash, clutch and power take-off are available for complete power units.

The new 250-hp. D-817 is the naturally aspirated version of this same basic diesel engine. Your nearby International Engine Distributor or Dealer can give you full details of either new model or on the 30 other diesel and carbureted construction equipment engines in his line. All 32 engines have one common feature —fastest payback power for users.

INTERNATIONAL®
ENGINES

International Harvester Co., 180 N. Michigan Avenue, Chicago 1, Illinois

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors... Self-Propelled Scrapers and Bottom-Dump Wagons... Crawler and Rubber-Tired Loaders... Off-Highway Haulers... Diesel and Carbureted Engines... Motor Trucks... Farm Tractors and Equipment.

1960 ENGINE SPECIFICATIONS

Diesel • Dual-Fuel • Natural Gas

Data on Engines Manufactured by American Diesel Engine Builders

Alco Products, Inc. S-2
Allis-Chalmers, Engine-Material Handling Div. S-2
American M.A.R.C., Inc. S-2
Baldwin-Lima-Hamilton Corp. S-2
Caterpillar Tractor Co. S-3
Cerlist Diesel, Inc. S-3
Chicago Pneumatic Tool Co. S-3
Clark Brothers Co. S-3
Climax Engine & Pump Mfg. Co. S-4
Continental Motors Corp. S-4
Cooper-Bessemer Corp. S-4
Cummins Engine Co., Inc. S-5
Enterprise Engine & Machinery Co. S-5
Fairbanks, Morse & Co. S-6
Ford Motor Co., Ford Div. S-6
GM-Cleveland Diesel Div. S-6
GM-Detroit Diesel Engine Div. ... S-6
GM-Electro-Motive Div. S-6
Gray Marine Motor Co. S-7
Harnischefeger Corp. P&H Diesel Div. S-7
Hercules Motors Corp. S-7
Ingersoll-Rand Co. S-7
International Harvester Co. S-8
Kahlenberg Brothers Co. S-8
Lufkin Foundry & Machine Co. ... S-8
Mack Trucks, Inc. S-8
Minneapolis-Moline Co. S-9
Murphy Diesel Co. S-9
Nordberg Mfg. Co. S-9
Oliver Corp. S-9
R. H. Sheppard Co., Inc. S-10
Sterling Engine Co. S-10
Union Diesel Engine Co. S-10
Waukesha Motor Co. S-10
White Diesel Engine Div., White Motor Co. S-11
White-Roth Machine Co. S-11
Witte Engine Works S-11
Worthington Corp. S-11

Foreign Diesel Engines Being Actively Sold in This Country

Burmeister and Wain American Corp. S-12
Daimler-Benz of N.A., Inc. (Mercedes-Benz) S-12
DAF of Holland, Inc. S-12
Henschel-Werke GmbH. S-13
Klockner-Humboldt-Deutz S-13
Lister-Blackstone, Inc. S-13
M.A.K. S-14
M.A.N. S-14
Napier Engines, Inc. S-14
F. Perkins (Canada) Ltd. S-15
Hawker Siddeley Brush, Inc. (Petters; Mirrlees; National) S-15
Sulzer Bros., Ltd. S-16
Volvo Diesels S-16

SYMBOL MEANINGS

Use

M—Marine propulsion service
S —Stationary service implying permanence of installation
P —Mobile, portable, or transportational service

Type

A —Diesel
B —Spark ignition natural gas engine
C—Diesel and dual-fuel
D —Diesel, dual-fuel, and natural gas engine
E—Gas engine angle compressor

Starting System

A —Air starting
E —Electric starting
G—Gasoline engine starting
H—Hand cranking
HY—Hydraulic starting

Fuel System

O—Own manufacture
B—American Bosch
S—Bendix-Scintilla
R—Roosa-Master
D—Demco
A—Adeco
C—CAV
G—Robert Bosch
M—Simms

Ignition

B—Battery system
LM—Low tension magneto
HM—High tension magneto
P—Pulse generator

Supercharging Systems

M—Mechanical
T—Turbocharger

Reverse Gears

D—Direct reversing
S —Snow-Nabstedt
T —Twin Disc
C—Capitol
W—Western Gear
P—Paragon
O—Own manufacture
F—Falk
H—Hindmarch-Delaval

Notes:
Model numbers are for basic engines and may vary for other ratings and uses.
Dimensions are given to the next largest inch.
Dimensions and weights are for basic model unless otherwise indicated.

Alco Products, Inc., 30 Church Street, New York, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
6-9 x 10½	C	M-S-P	4	6	9 x 10½	550-1000	720-1000	B	....	E-A	T	W-F	136	60	98	22100
12-9 x 10½	C	M-S-P	4	12	9 x 10½	1100-1950	720-1000	B	....	E-A	T	W**	158	61	110	32650
16-9 x 10½	C	M-S-P	4	16	9 x 10½	1470-2600	720-1000	B	....	E-A	T	W**	197	61	104	42000
6-12½ x 13	C	S-P	4	6	12½ x 13	580-660	600-740	B	....	E-A	....	....	156	60	82	34000†
6-12½ x 13T	C	S-P	4	6	12½ x 13	810-1000	600-740	B	....	E-A	T	....	156	60	115	36000†
8-12½ x 13	C	S	4	8	12½ x 13	775-860	600-720	B	....	A	....	....	200	60	96	49000
8-12½ x 13T	C	S	4	8	12½ x 13	1080-1300	600-720	B	....	A	T	....	225	60	115	50000

*Maximum HP. †Dimensions and weight for portable unit. **DeLaval-Hindmarch/Western.

Allis-Chalmers Mfg. Co., Engine-Material Handling Division, Milwaukee 1, Wis.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
6DA273	A	M-S-P	4	6	3¾ x 4½	58	2000	B	....	E	....	....	39	23	31	890
6D273	A	M	4	6	3¾ x 4½	85	2800	R	....	E	....	C-S	51	27	30	879
D344	A	S-P	4	4	4 11/16 x 5 5/16	72	1800	B	....	A-E	....	....	37	30	46	1565
D516	A	S-P	4	6	4 11/16 x 5 5/16	100	1800	B	....	A-E	....	....	48	30	46	1950
16000	A	M-S-P	4	6	5¼ x 6½	210	2000	B	....	A-E	....	C	58	36	48	2905
21000	A	M-S-P	4	6	5¼ x 6½	300	2000	B	....	A-E	T	C	58	36	57	3040
6DCB1879	A	M-S-P	4	6	6¾ x 8¾	330	1200	B	....	A-E	....	S	96	54	65	6925
6DCS1879	A	M-S-P	4	6	6¾ x 8¾	264	1200	B	....	A-E	M	S	100	54	65	7900
8DC2505	A	M-S-P	4	8	6¾ x 8¾	306	1200	B	....	A-E	....	W	149	52	92	12840
8DCS2505	A	M-S	4	8	6¾ x 8¾	400	1200	B	....	A-E	M	W	158	64	92	13240
G138	B	S-P	4	4	3⅝ x 3⅞	33.5	1650	..	B-HM	E	....	....	27	16	31	402
G149	B	S-P	4	4	3½ x 3⅞	39.8	1650	..	B-HM	E	....	....	30	20	46	500
G226	B	S-P	4	4	4 x 4½	63.2	1650	..	B-HM	E	....	....	37	20	56	700

*Intermittent HP.

American M. A. R. C., Inc., 1601 W. Florence Avenue, Inglewood, California

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
AC1	A	S	4	1	3½ x 3⅝	9¾	2800	B	....	H-E-HY	....	....	27	15	24	205
AC2	A	S	4	2	3½ x 3¾	19½	2800	B	....	H-E-HY	....	....	34	30	28	350
WC1	A	S	4	1	3⅞ x 3⅝	14	3000	B	....	H-E-HY	....	....	27	15	24	205
WC2	A	S	4	2	3⅞ x 3¾	28	3000	B	....	H-E-HY	....	....	34	25	25	350
WC1M	A	M	4	1	3⅞ x 3⅝	14	3000	B	....	H-E-HY	....	P	27	15	24	205
WC2M	A	M	4	2	3⅞ x 3¾	28	3000	B	....	H-E-HY	....	P	30	25	30	350
AC2M	A	M	4	2	3½ x 3¾	19½	2800	B	....	H-E-HY	....	P	36	25	26	350
GAC2	B	S	4	2	3½ x 3¾	14	2000	**	HM	H-E-HY	....	....	36	28	26	350
AMARC-10*	A	M	2	1	2⅝ x 2 + 2	9¼	3500	G	....	E	....	D	24†	13†	42†	99†

*Outboard engine of opposed-piston type †Dimensions and weights apply to complete unit **Ensign Carburetor and regulator

Baldwin-Lima-Hamilton Corp., Hamilton, Ohio

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.††
606-NA	C	M-S	4	6	12¾ x 15½	430-750	360-625	B-S	....	A-E	....	D†	159	76	91	35000
608-NA	C	M-S	4	8	12¾ x 15½	575-1000	360-625	B-S	....	A-E	....	D†	195	76	91	43500
606-SC	C	M-S	4	6	12¾ x 15½	650-1320	360-625	B-S	....	A-E	T	D†	170	86	91	36500
608-SC	C	M-S	4	8	12¾ x 15½	865-1750	360-625	B-S	....	A-E	T	D†	212	89	91	45000

*Continuous HP † Straight Reduction Gear or Reverse Reduction Gear. †† Weights are net for engine only.

Caterpillar Tractor Company, Peoria, Illinois

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
D311	A	M-S-P	4	4	4 x 5	75	2400	O	....	A-E-HY	....	T	44	27	36	1220
D318	A	M-S-P	4	6	4½ x 5½	175	2000	O	....	A-E-G	T	T	61	37	44	2450
D320	A	M-S-P	4	4	4 x 5	120	2400	O	....	A-E-HY	TA†	T	47	28	35	1340
D326	A	M-S-P	4	6	5¼ x 6½	200	2000	O	....	A-E-G	....	T	71	34	58	3550
D330	A	M	4	4	4½ x 5½	180	2200	O	....	A-E-HY	TA†	T	63	30	37	2040
D333	A	M	4	6	4½ x 5½	270	2200	O	....	A-E-HY	TA†	T	73	31	39	2890
D337	A	M-S-P	4	6	5¼ x 6½	345	2000	O	....	A-E-G	TA†	T	70	34	57	3750
G342	B	S	4	6	5¾ x 8	235**	1300	..	LM	A-E-G	....	....	81	45	65	5240
D342	A	M-S-P	4	6	5¾ x 8	320	1300	O	....	A-E-G	T	T	90	42	57	5340
D353	A	M-S-P	4	8	6¼ x 8	390	1300	O	....	A-E-G	T	T	75	46	69	6230
G375	B	S	4	V-8	5¾ x 8	310**	1300	..	LM	A-E-G	....	....	80	59	76	8150
D375	A	M-S-P	4	V-8	5¾ x 8	485	1300	O	....	A-E-G	TA†	T	86	53	79	8960
G397	B	S	4	V-12	5¾ x 8	470**	1300	..	LM	A-E-G	....	....	104	59	79	10700
D397	A	M-S-P	4	V-12	5¾ x 8	730	1300	O	....	A-E-G	TA†	O	108	53	79	11560

* *Maximum or rated horsepower* ** *Continuous horsepower* † *TA—Turbocharged and aftercooled*

Cerlist Diesel, Inc., Burlington, N. C.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
3	A	M-S-P	2	3	4 x 4½	85	3000	G	....	E-A-Hy	....	....	32	23	35	605

* *Maximum*

Chicago Pneumatic Tool Company, 6 East 44th Street, New York 17, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight
39-CP	D	S-P	4	3	9 x 10½	153	720	S	LM	A	....	....	68	44	67	8900
49-CP	D	S-P	4	4	9 x 10½	204	720	S	LM	A	....	....	84	44	67	10690
69-CP	D	S-P	4	6	9 x 10½	306	720	S	LM	A	....	....	112	44	67	14240
89-CP	D	S-P	4	8	9 x 10½	408	720	S	LM	A	....	....	140	44	67	16750
69-CPH	D	S-P	4	6	9 x 10½	384	900	B	LM	A	....	....	129	68	87	15500
89-CPH	D	S-P	4	8	9 x 10½	512	900	B	LM	A	....	....	158	68	87	19100
39CP	D	S-P	4	3	9½ x 10½	171	720	S	LM	A	....	....	68	44	67	8900
49CP	D	S-P	4	4	9½ x 10½	228	720	S	LM	A	....	....	84	44	67	10690
69CP	D	S-P	4	6	9½ x 10½	342	720	S	LM	A	....	....	112	44	67	14240
89CP	D	S-P	4	8	9½ x 10½	456	720	S	LM	A	....	....	140	44	67	16750
310CP	B	S-P	4	3	10 x 10½	189	720	S	LM	A	....	....	68	44	67	8900
410CP	B	S-P	4	4	10 x 10½	252	720	S	LM	A	....	....	84	44	67	10690
610CP	B	S-P	4	6	10 x 10½	378	720	S	LM	A	....	....	112	44	67	14240
810CP	B	S-P	4	8	10 x 10½	504	720	S	LM	A	....	....	140	44	67	16750
412-CP	D	S	4	4	11 x 12	340	720	S	LM	A	....	....	106	47	95	21200
512-CP	D	S	4	5	11 x 12	425	720	S	LM	A	....	....	124	55	95	25300
612-CP	D	S-P	4	6	11 x 12	510	720	S	LM	A	....	....	143	55	95	28400
812-CP	D	S-P	4	8	11 x 12	680	720	S	LM	A	....	....	178	68	95	32800
611-CP	D	S-P	4	6	11 x 14¼	504	600	S	LM	A	....	....	143	55	95	29800
814-CP	D	S-P	4	8	11 x 14¼	672	600	S	LM	A	....	....	178	68	95	34500
460-CP	D	S	4	4	16 x 20	600	360	S	LM	A	....	....	171	85	125	64700
462-CP	D	S	4	4	16 x 22	600	327	S	LM	A	....	....	171	85	125	64700
560-CP	D	S	4	5	16 x 20	750	360	S	LM	A	....	....	197	85	125	72800
562-CP	D	S	4	5	16 x 22	750	327	S	LM	A	....	....	197	85	125	72800
660-CP	D	S	4	6	16 x 20	900	360	S	LM	A	....	....	223	85	125	80900
662-CP	D	S	4	6	16 x 22	900	327	S	LM	A	....	....	223	85	125	80900
860-CP	D	S	4	8	16 x 20	1200	360	S	LM	A	....	....	275	106	125	101440
862-CP	D	S	4	8	16 x 22	1200	327	S	LM	A	....	....	275	106	125	101440
69-CPS	D	S-P	4	6	9 x 10½	540	720	S	LM	A	T	....	156	58	84	15740
89-CPS	D	S-P	4	8	9 x 10½	720	720	S	LM	A	T	....	184	58	84	18250
69CPS	D	S-P	4	6	9½ x 10½	543	720	S	LM	A	T	....	156	58	84	15740
89CPS	D	S-P	4	8	9½ x 10½	724	720	S	LM	A	T	....	184	58	84	18250
610CPS	B	S-P	4	6	10 x 10½	600	720	S	LM	A	T	....	156	58	84	15740
810CPS	B	S-P	4	8	10 x 10½	800	720	S	LM	A	T	....	184	58	84	18250
69-CPHS	D	S-P	4	6	9 x 10½	900	1050	B	LM	A	T	....	129	68	89	1 6500
89-CPHS	D	S-P	4	8	9 x 10½	1200	1050	B	LM	A	T	....	158	68	89	20100
412-CPS	D	S	4	4	11 x 12	615	720	S	LM	A	T	....	128	47	113	23400
512-CPS	D	S	4	5	11 x 12	770	720	S	LM	A	T	....	146	55	113	27500
612-CPS	D	S	4	6	11 x 12	925	720	S	LM	A	T	....	164	55	113	31600
812-CPS	D	S	4	8	11 x 12	1230	720	S	LM	A	T	....	216	68	113	35700
614-CPS	D	S	4	6	11 x 14¼	920	600	S	LM	A	T	....	164	55	113	32000
814-CPS	D	S	4	8	11 x 14¼	1225	600	S	LM	A	T	....	215	68	113	36000
623-CPS	D	S	4	6	12 x 13	1365	720	S	LM	A	T	....	196	86	135	39000
625-CPS	D	S	4	6	12 x 15	1315	600	S	LM	A	T	....	196	86	135	39000
823-CPS	D	S	4	8	12 x 13	1820	720	S	LM	A	T	....	225	86	135	47000
825-CPS	D	S	4	8	12 x 15	1750	600	S	LM	A	T	....	225	86	135	47000
1023-CPS	D	S	4	10	12 x 13	2280	720	S	LM	A	T	....	266	86	135	55000
1025-CPS	D	S	4	10	12 x 15	2200	600	S	LM	A	T	....	266	86	135	55000
460-CPS	D	S	4	4	16 x 20	950	360	S	LM	A	T	....	210	85	125	68130
462-CPS	D	S	4	4	16 x 22	950	327	S	LM	A	T	....	210	85	125	68130
560-CPS	D	S	4	5	16 x 20	1188	360	S	LM	A	T	....	236	106	125	76540
562-CPS	D	S	4	5	16 x 22	1188	327	S	LM	A	T	....	236	106	125	76540
660-CPS	D	S	4	6	16 x 20	1425	360	S	LM	A	T	....	262	106	125	84950
662-CPS	D	S	4	6	16 x 22	1425	327	S	LM	A	T	....	262	106	125	84950
860-CPS	D	S	4	8	16 x 20	1900	360	S	LM	A	T	....	320	116	125	106800
862-CPS	D	S	4	8	16 x 22	1900	327	S	LM	A	T	....	320	116	125	106800

* *Continuous HP.*

Clark Bros. Co., Division of Dresser Industries Inc., Olean, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
HMA-4	E	S-P†	2	4	8¼ x 8¼	175	600	O	LM	A	....	....	246	105	107	....
HMA-6	E	S-P†	2	6	8¼ x 8¼	265	600	O	LM	A	....	....	273	105	107	.....
HMA-8	E	S-P†	2	8	8¼ x 8¼	350	600	O	LM	A	....	....	301	105	107	.....
HMA-10	E	S-P†	2	10	8¼ x 8¼	440	600	O	LM	A	....	....	366	105	110	.....
HMB-6	E	S-P†	2	6	8⅝ x 8⅞	330	600	O	LM	A	....	....	337	105	118	.....
HMB-8	E	S-P†	2	8	8⅝ x 8⅞	440	600	O	LM	A	....	....	365	105	118	.....
HMB-10	E	S-P†	2	10	8⅝ x 8⅞	550	600	O	LM	A	....	....	417	105	118	.....
TMB-8	E	S-P†	2	8	8⅝ x 8⅞	525	600	O	LM	A	T	....	365	105	118	.....
TMB-10	E	S-P†	2	10	8⅝ x 8⅞	660	600	O	LM	A	T	....	417	105	118	.....
HRA-6	E	S	2	6	14 x 14	750	330	O	LM	A	....	....	233	204	108	.....

Clark Bros. Co., Olean, New York (Continued)

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
HRA-8	E	S	2	8	14 x 14	1000	330	O	LM	A	....	....	264	204	108	.....
HRA-4T	E	S	2	4	14 x 14	660	330	O	LM	A	T	....	196	204	108	.....
HRA-5T	E	S	2	5	14 x 14	800	330	O	LM	A	T	....	214	204	108	.....
HRA-6T	E	S	2	6	14 x 14	1000	330	O	LM	A	T	....	228	204	108	.....
HRA-8T	E	S	2	8	14 x 14	1320	330	O	LM	A	T	....	264	204	108	.....
TRA-6	E	S	2	6	14 x 14	1100	360	O	LM	A	T	....	229	182	151	.....
TRA-8	E	S	2	8	14 x 14	1500	360	O	LM	A	T	....	306	182	151	.....
TRA-10	E	S	2	10	14 x 14	1800	360	O	LM	A	T	....	358	182	151	.....
HBA-5	E	S	2	5	17 x 17	1200	330	O	LM	A	....	....	...	...	...	.....
HBA-6	E	S	2	6	17 x 17	1440	330	O	LM	A	....	....	...	...	...	.....
HBA-8	E	S	2	10	17 x 17	2400	330	O	LM	A	....	....	...	...	...	.....
HBA-10	E	S	2	8	17 x 17	1920	330	O	LM	A	....	....	...	...	...	.....
TLA-5	E	S	2	5	17 x 19	1700	330	O	LM	A	T	....	...	...	...	.....
TLA-6	E	S	2	6	17 x 19	2000	330	O	LM	A	T	....	323	224	192	.....
TLA-8	E	S	2	8	17 x 19	2700	330	O	LM	A	T	....	344	224	192	.....
TLA-10	E	S	2	10	17 x 19	3400	330	O	LM	A	T	....	437	224	192	.....
TPV-10	B	S	2	10	17 x 19	4000	330	O	P	A	T	....	229	134	158	210000
TPV-12	B	S	2	12	17 x 19	4800	330	O	P	A	T	....	260	134	158	250000
TPV-16	B	S	2	16	17 x 19	6400	330	O	P	A	T	....	320	134	158	327000

*Continuous. †Semi-portable.

Climax Engine Mfg. Co., Division of Waukesha Motor Co., Factory—Clinton, Iowa

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
R165	B	S-P	4	6	6¼ x 7	140**	1050	..	B-HM	A-E-G	....	....	74	30	51	3250
K67	B	S-P	4	6	7 x 7	194**	1050	..	B-HM	A-E-G	....	....	71	30	58	5400
K75	B	S-P	4	6	7½ x 7	216**	1050	..	B-HM	A-E-G	....	....	71	30	58	5400
V80	B	S	4	8	7 x 7	250**	1050	..	B-HM	A-E-G	....	....	79	51	59	8400
V85	B	S	4	8	7½ x 7	285**	1050	..	B-HM	A-E-G	....	....	79	51	59	8600
V122	B	S	4	12	7 x 7	380**	1050	..	B-HM	A-E-G	....	....	103	51	59	11000
V125	B	S	4	12	7½ x 7	444**	1050	..	B-HM	A-E-G	....	....	103	51	59	11600

* Continuous HP ** Based on natural gas fuel

Continental Motors Corporation, Muskegon, Michigan

Model	Type	Use	Cycle	No. Cyl	Bore & Stroke In.	HP.*	R.P.M.†	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight lb.
ZD129**	A	S**	4	4	3¼ x 3⅞	34	2000	R	....	E	....	....	...	...	...	485
GD157	A	M-S-P	4	4	3⅜ x 4⅛	39	2000	R-B	....	E	....	....	32	16	31	605
GD193	A	..	4	4	3⅜ x 4⅝	55.5	2200	R	....	E	....	....	...	...	...	.....
ED201**	A	S**	4	4	3⅝ x 4⅞	45.8	2000	R-B	....	E	....	....	...	...	...	655
HD243	A	S-P	4	4	3¾ x 5½	68.9	2200	R-B	....	E	....	....	34	22	35	840
HD260**	A	S**	4	4	3⅞ x 5½	74	2400	R-B	....	E	....	....	34	22	35	840
HD277**	A	S**	4	4	4 x 5½	79	2400	R-B	....	E	....	....	34	22	35	850
JD382**	A	S**	4	4	4½ x 6	87.4	2000	B	....	E	....	....	...	...	...	925
JD403**	A	..	4	4	4½ x 6	91.5	2000	R	....	E	....	....	...	...	...	.....
TD427	A	S	4	6	4⅛ x 4⅞	132	2200	B	....	E	....	....	47	25	36	1300
RD572	A	S	4	6	4¾ x 5⅜	154	2000	B	....	E	....	....	52	30	43	1845
VD603	A	S	4	8	4¾ x 4¼	197	2600	R	....	E	....	....	44	34	47	1696
SD802	A	S	4	6	5⅛ x 5½	202	1800	B	....	E	....	....	...	...	...	2160
TD6427	A	M-P	4	6	4⅛ x 4⅞	146.5	2600	B	....	E	....	....	47	25	36	1270
RD6572	A	M-P	4	6	4¾ x 5⅜	172	2400	B	....	E	....	....	52	30	46	1785
VD8603	A	P	4	8	4¾ x 4¼	200	2800	R	....	E	....	....	44	34	47	1680
SD6802	A	M-P	4	6	5⅛ x 5½	225	2200	B	....	E	....	....	...	...	...	2140
Y-112	B	S-P	4	4	3⅛ x 3½	30.7	2800	..	B-LM-HM	E	....	....	26	15	26	265
F-162	B	S-P	4	4	3⅞ x 4⅜	49	2800	..	B-LM-HM	E	....	....	29	16	29	370
F-226	B	S-P	4	6	3⅛ x 4⅜	67	2800	..	B-LM-HM	E	....	....	36	16	29	510
F-244	B	..	4	6	3⅞ x 4⅜	72.5	2800	..	B-LM-HM	E	....	....	...	...	...	790
M-330	B	S-P	4	6	4 x 4⅜	104	2800	..	B-LM-HM	E	....	....	43	22	34	725
M-363	B	..	4	6	4 x 4 13/16	109.3	2800	..	B-LM-HM	E	....	....	...	...	...	800
H-260	B	..	4	4	3⅞ x 5⅛	57.1	1800	..	B-LM-HM	E	....	....	34	22	35	740
H-277	B	..	4	4	4 x 5½	60.4	1800	..	B-LM-HM	E	....	....	...	...	...	....
K-363	B	..	4	6	4 x 4 13/16	130	2600	..	B-LM-HM	E	....	....	...	...	...	985
J-382	B	..	4	4	4½ x 6	83.5	1600	..	B-LM-HM	E	....	....	...	...	...	950
T-427	B	..	4	6	4⅛ x 4⅞	135	2400	..	B-LM-HM	E	....	....	47	21	36	1100
B-427	B	S-P	4	6	4⅛ x 4⅞	127	2800	..	B-LM-HM	E	....	....	46	22	34	870
U-501	B	S-P	4	6	4½ x 5¼	170.5	2600	..	B-LM-HM	E	....	....	52	28	45	1670
R-602	B	S-P	4	6	4⅞ x 5⅜	205	2600	..	B-LM-HM	E	....	....	52	28	45	1670
S-749	B	S-P	4	6	5⅛ x 5½	190.5	2000	..	B-LM-HM	E	....	....	58	28	48	1910
S-820	B	..	4	6	5⅜ x 5½	271	2600	..	B-LM-HM	E	....	....	...	...	...	2170

* *Horsepower Given is Bare Engine Rating.* ** *Available for Industrial Applications only.* † *R.P.M. is Governed Speed.*

The Cooper-Bessemer Corporation, Mt. Vernon, Ohio

Model**	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.†	Height In.††	Weight Lb.†††
FW6	A	M-S-P	4	6	9 x 10½	430	1000	S	....	A	....	O	130	35	80	17800
FW6T	A	M-S-P	4	6	9 x 10½	720	1000	S	....	A	T	O	176	35	80	18300
FWB-6-LT	A	M-S-P	4	6	9 x 10½	990	1000	S	....	A	T	O	176	35	80	23300
FVA8	A	M-S-P	4	8	9 x 10½	575	1000	S	....	A	....	O	102	44	58	22000
FVB8T	A	M-S-P	4	8	9 x 10½	1320	1000	S	....	A	T	O	124	44	58	27240
FVA12	A	M-S-P	4	12	9 x 10½	860	1000	S	....	A	....	O	140	44	58	26000
FVB12T	A	M-S-P	4	12	9 x 10½	1980	1000	S	....	A	T	O	140	44	58	37800
FVA16	A	M-S-P	4	16	9 x 10½	1150	1000	S	....	A	....	O	165	44	58	32000
FVB16T	A	M-S-P	4	16	9 x 10½	2640	1000	S	....	A	T	O	165	44	58	46430
GP6	D	M-S	4	6	10¼ x 13½	565	750	O	B	A	....	D	142	38	68	21500
GS6T	D	M-S	4	6	10¼ x 13½	1200	750	O	B	A	T	D	174	38	68	22250
GS8	D	M-S	4	8	10¼ x 13½	775	750	O	B	A	....	D	175	38	68	29500
GS8T	D	M-S	4	8	10¼ x 13½	1600	750	O	B	A	T	D	206	38	68	30250
JS5	D	S	4	5	13 x 16	515	450	O	B	A	....	....	149	45	80	41000
JS6	D	M-S	4	6	13 x 16	705	514	O	B	A	....	D	171	45	80	44000
JS6T	D	M-S	4	6	13 x 16	1485	514	O	B	A	T	D	200	45	80	45000
JS7	D	S	4	7	13 x 16	820	514	O	B	A	....	....	198	45	80	48000
JS7T	D	S	4	7	13 x 16	1735	514	O	B	A	T	....	221	45	80	49000
JS8	D	M-S	4	8	13 x 16	935	514	O	B	A	....	D	210	45	80	51000
JS8T	D	M-S	4	8	13 x 16	1980	514	O	B	A	T	D	239	45	80	52000
LS6	D	M-S	4	6	15¼ x 22	965	360	O	B	A	....	D	224	56	120	76000
LS6T	D	M-S	4	6	15¼ x 22	2040	360	O	B	A	T	D	251	56	120	77000
LS7	D	S	4	7	15¼ x 22	1125	360	O	B	A	....	....	248	56	120	91000
LS7T	D	S	4	7	15¼ x 22	2380	360	O	B	A	T	....	270	56	120	92000
LS8	D	M-S	4	8	15¼ x 22	1285	360	O	B	A	....	D	276	56	120	106000
LS8T	D	M-S	4	8	15¼ x 22	2720	360	O	B	A	T	D	299	56	120	107000
LSV12	D	M-S	4	12	15¼ x 22	1925	360	O	B	A	....	D	252	68	117	194500
LSV12T	D	M-S	4	12	15¼ x 22	4100	360	O	B	A	T	D	300	68	117	197500
LSV16	D	M-S	4	16	15¼ x 22	2565	360	O	B	A	....	D	307	68	117	232500
LSV16T	D	M-S	4	16	15¼ x 22	5450	360	O	B	A	T	D	355	68	117	237500

Model**	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.†	Height In.††	Weight Lb.†††
GMXD-4	E	S-P***	2	4	9¾ x 10½	265	450	..	LM	A	M	....	...	...	...	.....
GMXD-6	E	S-P***	2	6	9¾ x 10½	400	450	..	LM	A	M	....	...	...	...	.....
GMXD-8	E	S-P***	2	8	9¾ x 10½	550	450	..	LM	A	M	....	...	...	...	.....
GMXD-10	E	S-P***	2	10	9¾ x 10½	660	450	..	LM	A	M	....	...	...	...	.....
GMXF-4	E	S-P***	2	4	9¾ x 10½	330	450	..	LM	A	T	....	...	...	...	.....
GMXF-6	E	S-P***	2	6	9¾ x 10½	500	450	..	LM	A	T	....	...	...	...	.....
GMXF-8	E	S-P***	2	8	9¾ x 10½	660	450	..	LM	A	T	....	...	...	...	.....
GMXF-10	E	S-P***	2	10	9¾ x 10½	825	450	..	LM	A	T	....	...	...	...	.....
GMVA-4	E	S	2	4	14 x 14	540	300	..	LM	A	M	....	...	...	...	.....
GMVA-6	E	S	2	6	14 x 14	800	300	..	LM	A	M	....	...	...	...	.....
GMVA-8	E	S	2	8	14 x 14	1100	300	..	LM	A	M	....	...	...	...	.....
GMVA-10	E	S	2	10	14 x 14	1350	300	..	LM	A	M	....	...	...	...	.....
GMVC-4	E	S	2	4	14 x 14	720	300	..	LM	A	T	....	...	...	...	.....
GMVC-6	E	S	2	6	14 x 14	1000	300	..	LM	A	T	....	...	...	...	.....
GMVC-8	E	S	2	8	14 x 14	1440	300	..	LM	A	T	....	...	...	...	.....
GMVC-10	E	S	2	10	14 x 14	1800	300	..	LM	A	T	....	...	...	...	.....
GMWA-6	E	S	2	6	18 x 20	1500	250	..	LM	A	M	....	...	...	...	.....
GMWA-8	E	S	2	8	18 x 20	2000	250	..	LM	A	M	....	...	...	...	.....
GMWA-10	E	S	2	10	18 x 20	2500	250	..	LM	A	M	....	...	...	...	.....
GMWC-6	E	S	2	6	18 x 20	2000	250	..	LM	A	T	....	...	...	...	.....
GMWC-8	E	S	2	8	18 x 20	2800	250	..	LM	A	T	....	...	...	...	.....
GMWC-10	E	S	2	10	18 x 20	3500	250	..	LM	A	T	....	...	...	...	.....

** *Engines have open combustion chamber.* †† *Height is given above shaft.* † *Width is between bolt centers.* ††† *All weights and dimensions for stationary units.*

* *Continuous HP.* *** *Semi-portable.*

Cummins Engine Company, Inc., Columbus, Indiana

Model	Type	Use††	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
J-70	A	M-S-P	4	4	4½ x 5	70	2000	O	....	E	....	....	35	25	45	1185
J-80	A	M-S-P	4	4	4½ x 5	80	2500	O	....	E	....	....	35	25	45	1185
J-6	A	M-S-P	4	6	4½ x 5	100	1800	O	....	E	....	T	46	27	42	1505
JF-6	A	M-S-P	4	6	4½ x 5	110	2200	O	....	E	....	T	46	27	42	1545
JN-130	A	M-S-P	4	6	4½ x 5	130	2500	O	....	E	....	T	46	27	43	1630
JNS-6	A	M-S-P	4	6	4½ x 5	175	2500	O	....	E	M	S	46	26	44	1610
JS-6	A	M-S-P	4	6	4½ x 5	160	2500	O	....	E	M	....	46	26	40	1655
JT-6	A	M-S-P	4	6	4½ x 5	175	2500	O	....	E	T	S	46	27	44	1670
C-90	A	M-S-P	4	4	4⅛ x 5	90	2000	O	....	E	....	....	36	25	45	1185
C-105	A	M-S-P	4	4	4⅛ x 5	105	2500	O	....	E	....	....	36	25	45	1185
C-160	A	M-S-P	4	6	4⅛ x 5	160	2500	O	....	E	....	....	50	27	43	1630
C-175	A	M-S-P	4	6	4⅛ x 5	175	2500	O	....	E	T	....	46	26	44	1670
C-180	A	M-S-P	4	6	4⅛ x 5	180	2500	O	....	E	M	....	46	26	44	1610
HRC-4	A	M-S-P	4	4	5⅛ x 6	115	1800	O	....	E	....	T	45	30	48	1755
H-6	A	M-S-P	4	6	4⅞ x 6	160	1800	O	....	E	....	T	58	30	49	2370
HR-6	A	M-S-P	4	6	5⅛ x 6	175	1800	O	....	E	....	T	58	30	49	2370
HRF-6	A	P	4	6	5⅛ x 6	190	2000	O	....	E	....	....	60	30	49	2385
HS-6	A	S-P	4	6	4⅞ x 6	210	1800	O	....	E	M	T	59	33	49	2475
HRS-6	A	M-S-P	4	6	5⅛ x 6	240	1800	O	....	E	M	T	60	32	49	2610
NHC-4	A	M-S-P	4	4	5⅛ x 6	130	2000	O	....	E	....	T	45	27	49	1895
NT-165	A	M-S-P	4	4	5⅛ x 6	165	2000	O	....	E	T	....	43	30	54	2020
NT-180	A	P	4	4	5⅛ x 6	180	2100	O	....	E	T	....	45	36	47	1995
NT-200	A	P	4	4	5⅛ x 6	200	2100	O	....	E	T	....	45	36	47	1995
NH-180	A	P	4	6	4⅞ x 6	180	2100	O	....	E	....	....	60	31	49	2400
NH-195	A	P	4	6	4⅞ x 6	195	2100	O	....	E	....	....	60	31	49	2420
NHE-180	A	P	4	6	5⅛ x 6	180	1950	O	....	E	....	....	61	32	49	2400
NHE-195	A	P	4	6	5⅛ x 6	195	1950	O	....	E	....	....	61	32	49	2420
NH-220	A	M-S-P	4	6	5⅛ x 6	220	2100	O	....	E	....	C	61	32	49	2420
NH-250	A	P	4	6	5⅛ x 6	250	2100	O	....	E	....	....	61	28	48	2590
NHS-6	A	M-S-P	4	6	5⅛ x 6	290	2100	O	....	E	M	C	60	35	50	2720
NHRS-6	A	M-S-P	4	6	5⅛ x 6	320	2100	O	....	E	M	C	60	35	50	2720
NT-6	A	M-S-P	4	6	5⅛ x 6	250	2100	O	....	E	T	C	61	39	49	2515
NTO-6	A	M-S-P	4	6	5⅛ x 6	262	2100	O	....	E	T	C	61	39	49	2515
NRT-6	A	M-S-P	4	6	5⅛ x 6	300	2100	O	....	E	T	C	60	39	49	2525
NRTO-6	A	M-S-P	4	6	5⅛ x 6	335	2100	O	....	E	T	C	60	39	49	2585
NT-380	A	P	4	6	5½ x 6	380	2300	O	....	E	T	....	60	39	49	2520
V8-350	A	P	4	8	5½ x 5	350	2500	O	....	E	....	....	57	46	47	2940
VT8-430	A	P	4	8	5½ x 5	430	2500	O	....	E	T	....	57	46	47	2990
NVH-12	A	M-S-P	4	12	5½ x 6	450	2100	O	....	E	....	S	74	50	54	5150
VT-12	A	M-S-P	4	12	5½ x 6	600	2100	O	....	E	T	C	74	45	61	5300
L-6	A	M-S	4	6	7 x 10	265	1000	O	....	A-E	....	C	99	40	59	7590
LR-6	A	M-S	4	6	7¼ x 10	320	1100	O	....	A-E	....	C	100	40	59	7590
LRT-6	A	M-S	4	6	7¼ x 10	450	1100	O	....	A-E	T	C	100	40	59	7690

* *Maximum HP* †† *All except "L" models suitable for automotive and other portable applications.*

Enterprise Engine & Machinery Co., Subsidiary of General Metals Corp., 18th & Florida Streets, San Francisco, Calif.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
DM6	D	M-S-P	4	6	8 x 10	146-324	450-1000	S	LM-P	A-E	....	**	92	41	64	13200
DM36	D	M-S-P	4	6	8 x 10	231-762	450-1000	S	LM-P	A-E	T	**	92	41	64	13800
DM8	D	M-S-P	4	8	8 x 10	194-432	450-1000	S	LM-P	A-E	....	**	116	41	64	16100
DM38	D	M-S-P	4	8	8 x 10	308-1015	450-1000	S	LM-P	A-E	T	**	116	41	64	18000
DG-6	D	M-S-P	4	6	12 x 15	273-819	250-750	S	LM-P	A	....	D	147	58	99	38800
DG-36	D	M-S-P	4	6	12 x 15	434-1928	250-750	S	LM-P	A	T	D	147	58	99	39900
DG-8	D	M-S-P	4	8	12 x 15	364-1092	250-750	S	LM-P	A	....	D	181	58	99	48000
DG-38	D	M-S-P	4	8	12 x 15	578-2570	250-750	S	LM-P	A	T	D	181	58	99	49962
DQ-6	D	M-S-P	4	6	16 x 20	647-1086	250-400	S	LM-P	A	....	D	197	74	126	87400
DQ-36	D	M-S-P	4	6	16 x 20	1028-2437	250-400	S	LM-P	A	T	D	197	74	126	89600
DQ-8	D	M-S-P	4	8	16 x 20	863-1381	250-400	S	LM-P	A	....	D	245	74	126	105513
DQ-38	D	M-S-P	4	8	16 x 20	1371-3249	250-400	S	LM-P	A	T	D	245	74	126	107913
DR-6	D	M-S-P	4	6	17 x 21	767-1228	250-400	S	LM-P	A	....	D	197	74	126	89900
DR-36	D	M-S-P	4	6	17 x 21	1219-2889	250-400	S	LM-P	A	T	D	197	74	126	92500
DR-8	D	M-S-P	4	8	17 x 21	945-1637	250-400	S	LM-P	A	....	D	245	74	126	107800
DR-38	D	M-S-P	4	8	17 x 21	1625-3852	250-400	S	LM-P	A	T	D	245	74	126	109900
DRV-12	D	M-S-P	4	12	17 x 21	1228-2455	200-400	S	LM-P	A	....	D	197	96	145	142600
DRV-12-3	D	M-S-P	4	12	17 x 21	2891-5782	200-400	S	LM-P	A	T	D	197	96	145	147900
DRV-16	D	M-S-P	4	16	17 x 21	1637-3274	200-400	S	LM-P	A	....	D	245	96	145	181800
DRV-16-3	D	M-S-P	4	16	17 x 21	3852-7703	200-400	S	LM-P	A	T	D	245	96	145	189100

**Continuous HP* †*All models available with trifuel equipment* ***Reverse and reduction gear used—make varies.*

Fairbanks, Morse & Company, 600 S. Michigan Avenue, Chicago, Ill.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
31A18	C	S	2	6	18 x 27	2100	277	O	....	A	....	....	....	....	....	.....
31A18	C	S	2	8	18 x 27	2800	277	O	....	A	....	....	....	....	....	.....
31A18	C	S	2	10	18 x 27	3500	277	O	....	A	....	....	....	....	....	.....
31A18	C	S	2	12	18 x 27	4200	277	O	....	A	....	....	....	....	....	.....
38F5¼	D	M-S-P	2	4	5¼ x 7¼	150–352	600–1200	O	....	A-E	....	S	....	....	....	.....
38F5¼	D	M-S-P	2	5	5¼ x 7¼	188–440	600–1200	O	....	A-E	....	S	....	....	....	.....
38F5¼	D	M-S-P	2	6	5¼ x 7¼	225–528	600–1200	O	....	A-E	....	S	....	....	....	.....
38F5¼	D	M-S-P	2	7	5¼ x 7¼	263–616	600–1200	O	....	A-E	....	S	....	....	....	.....
38F5¼	D	M-S-P	2	8	5¼ x 7¼	300–704	600–1200	O	....	A-E	....	S	....	....	....	.....
38F5¼	D	M-S-P	2	10	5¼ x 7¼	375–880	600–1200	O	....	A-E	....	F	....	....	....	.....
38D8⅛	D	M-S-P	2	4	8⅛ x 10	400–800†	450–900	O	....	A	†	D	....	....	....	.....
38D8⅛	D	M-S-P	2	5	8⅛ x 10	500–1000†	450–900	O	....	A	†	D	....	....	....	.....
38D8⅛	D	M-S-P	2	6	8⅛ x 10	600–1200†	450–900	O	....	A	†	D	....	....	....	.....
38D8⅛	D	M-S-P	2	8	8⅛ x 10	800–1600†	450–900	O	....	A	†	D	....	....	....	.....
38D8⅛	D	M-S-P	2	10	8⅛ x 10	1000–2000†	450–900	O	....	A	†	D	....	....	....	.....
38D8⅛	D	M-S-P	2	12	8⅛ x 10	1200–2400†	450–900	O	....	A	†	D	....	....	....	.....
45C3½	A	S	4	1	3½ x 4	5¼	1800	D	....	H-E	....	....	....	....	....	.....
45C4½	A	S	4	1	4½ x 4½	10½	1800	D	....	H-E	....	....	....	....	....	.....
45C4½-2	A	M-S	4	2	4½ x 5¼	32	1800	D	....	H-E	....	C-P	....	....	....	... *
48B	A	M-S-P	4	2	3½ x 4	20	1800	O	....	H-E	....	....	....	....	....	.....
48B	A	M-S-P	4	4	3½ x 4	40	1800	O	....	H-E	....	....	....	....	....	.....
48B	A	M-S-P	4	4	4½ x 5	88	1800	O	....	H-E	....	....	....	....	....	.....
49B4½	A	M-S-P	2	2	4½ x 5½	58	1800	....	....	A-E	....	....	....	....	....	.....
49B4½	A	M-S-P	2	3	4½ x 5½	90	1800	....	....	A-E	....	....	....	....	....	.....
49B4½	A	M-S-P	2	3	4½ x 5½	115	1800	....	....	A-E	T	....	....	....	....	.....
49B4½	A	M-S-P	2	4	4½ x 5½	126	1800	....	....	A-E	....	....	....	....	....	.....
49B4½	A	M-S-P	2	4	4½ x 5½	155	1800	....	....	A-E	T	....	....	....	....	.....
49B4½	A	M-S-P	2	6	4½ x 5½	180	1800	....	....	A-E	....	....	....	....	....	.....
49B4½	A	M-S-P	2	6	4½ x 5½	230	1800	....	....	A-E	T	....	....	....	....	.....
49B4½	A	M-S-P	2	8**	4½ x 5½	252	1800	....	....	A-E	....	....	....	....	....	.....
49B4½	A	M-S-P	2	8**	4½ x 5½	310	1800	....	....	A-E	T	....	....	....	....	.....
49B4½	A	M-S-P	2	12††	4½ x 5½	360	1800	....	....	A-E	....	....	....	....	....	.....
49B4½	A	M-S-P	2	12††	4½ x 5½	460	1800	....	....	A-E	T	....	....	....	....	.....

* *Continuous HP* † *All model 38D8 ⅛ opposed piston engines are also offered with turbocharging with increased ratings up to 50% above ratings listed.*
** *Twin 4 cylinder* †† *Twin 6 cylinder.*

Ford Division, Ford Motor Co., P. O. 598, Dearborn, Michigan

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	H.P.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
X	A	M-S-P	4	4	3.94 x 4.52	48	2250	M	....	E	....	....	31	28	35	690
Y	A	M-S-P	4	6	3.94 x 4.52	77	2250	M	....	E	....	....	42	24	40	880

* *Continuous HP.*

General Motors Corporation, Cleveland Diesel Engine Division, 2160 W. 106 St., Cleveland, Ohio

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
6-268A	D	M-S	2	6	6½ x 7	340	1200	O	....	A-E	....	F	97	41	67**	7000
8-268A	D	M-S	2	8	6½ x 7	450	1200	O	....	A-E	....	F	117	41	67**	8600
8-498	D	M-S	2	8	8¾ x 10½	1400	800	O	....	A	T	F	152	64	112**	28600
12-498	D	M-S	2	12	8¾ x 10½	2100	800	O	....	A	T	F	193	64	112**	39000
16-498	D	M-S	2	16	8¾ x 10½	2800	800	O	....	A	T	F	234	66	121**	46000
8-567C	D	M-S	2	8	8½ x 10¾	900	800	O	....	A	....	F	138	62	112**	19500
12-567C	D	M-S	2	12	8½ x 10¾	1350	800	O	....	A	....	F	175	65	112**	27800
16-567C	D	M-S	2	16	8½ x 10¾	1800	800	O	....	A	....	F	214	62	112**	33900

Dimensions and weights are for basic engines. * *Continuous HP.* ** *Height is over-all engine height.*

General Motors Corporation, Detroit Diesel Engine Division, 13400 W. Outer Drive, Detroit, Michigan

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.††	Width In.††	Height In.††	Weight Lb.††
2-53	A	S-P	2	2	3⅞ x 4½	33–47	1800–2000	O	....	E-Hy	M**	....	27	26	35	770
3-53	A	M-S-P	2	3	3⅞ x 4½	58–97	2200–2800	O	....	E-Hy	M**	BW***	34	26	35	940
4-53	A	M-S-P	2	4	3⅞ x 4½	82–130	2200–2800	O	....	E-Hy	M**	BW***	39	26	35	1110
6V-53	A	M-P	2	6	3⅞ x 4½	195	2800	O	....	E-Hy	M**	BW***	34	39	35	1340
2-71	A	S-P	2	2	4.25 x 5	40–67	1800–2000	O	....	E-HY	M**	....	32	28	40	960
3-71	A	M-S-P	2	3	4.25 x 5	67–118	1800–2300	O	....	G-A-E-HY	M**	P-O	37	29	40	1525
4-71	A	M-S-P	2	4	4.25 x 5	93–167	1800–2300	O	....	G-A-E-HY	M**	P-O	42	29	42	1770
4-71T	A	M-P	2	4	4.25 x 5	171–197	2300	O	....	E-HY	T	P-O	44	45	40	1760
6-71	A	M-S-P	2	6	4.25 x 5	142–252	1800–2300	O	....	G-A-E-HY	M**	O	54	31	43	2210
6-71T	A	M-S-P	2	6	4.25 x 5	224–300	2100–2300	O	....	E-HY	T	O	56	34	51	2255
6V-71	A	M-S-P	2	6	4¼ x 5	162–252	1800–2300	O	....	E-Hy	M**	O	42	38	47	2010
8V-71	A	M-S-P	2	8	4¼ x 5	210–336	1800–2300	O	....	E-Hy	M**	O	47	36	48	2505
12V-71	A	M-S-P	2	12	4¼ x 5	319–504	1800–2300	O	....	E-Hy	M**	T	60	46	55	3505
Twin 4-71	A	S	2	8	4.25 x 5	182–334	1800–2300	O	....	E-A-G-HY	M**	....	70	56	58	4820
Twin 6-71	A	M-S	2	12	4.25 x 5	280–504	1800–2300	O	....	E-A-G-HY	M**	O	81	56	58	5620
Twin 6-71†	A	M	2	12	4.25 x 5	295–504	1800–2300	O	....	E-HY	M**	O	129	40	62	7550
Twin 6-71T	A	M	2	12	4.25 x 5	600	2300	O	....	E-HY	T	O	86	66	57	6890
Quad 6-71	A	M-S	2	24	4.25 x 5	556–1008	1800–2300	O	....	E-A-G-HY	M**	O	181	58	69	12425
6-110	A	M-S-P	2	6	5 x 5.6	210–335	1800–2000	O	....	E-HY	M**	O	63	38	49	3260
6-110T	A	M-P	2	6	5 x 5.6	334–349	2000	O	....	E-HY	T	O	63	38	55	3380
Twin 6-110	A	S	2	12	5 x 5.6	416–670	1800–2000	O	....	E-A-G-HY	M**	....	125	66	89	11440
Twin 6-110†	A	M	2	12	5 x 5.6	440–670	1800–2000	O	....	E-HY	M**	O	145	54	72	10800

* *Where a horsepower and rpm range is shown, the low end is the continuous rating and the high end is the maximum engine rating. Turbopower models shown with "rated" spread. Twin and Quads shown with continuous to "rated" spread.*** *Borg Warner*
† *Tandem arrangements.* ** *Pressure Scavenging.* †† *Weights and dimensions are given for industrial ("S" & "P") units. Weights and dimensions for "Twins" and "Quads" are shown with radiators and power take-offs, (except marine). Torque converters are available with industrial models.*

General Motors Corporation, Electro-Motive Division, LaGrange, Illinois

Model	Type	Use†	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
6-567C	C	S-P	2	6	8½ x 10	540–600	720–800	O	....	E	....	....	126	65	89	15000
8-567C	C	S-P	2	8	8½ x 10	720–875	720–835	O	....	E	....	....	142	63	89	18000
12-567C	C	S-P	2	12	8½ x 10	1080–1310	720–835	O	....	E	....	....	156	65	89	25000
16-567D1	C	S-P	2	16	8½ x 10	1440–1800	720–835	O	....	E	....	....	215	63	89	31500
16-567D2	C	S-P	2	16	8½ x 10	1440–2000	835–900	O	....	E	T	....	217	65	89	33500
16-567D3	C	S-P	2	16	8½ x 10	2000–2880	835–900	O	....	E	T	....	217	65	89	34000

† *Engines are available for Marine use through Cleveland Diesel Engine Division, General Motors Corporation.*
* Continuous HP.

Gray Marine Motor Company, 710 Canton Avenue, Detroit 7, Michigan

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
4-D129	A	M	4	4	3¼ x 3⅞	22.5-30	2000-2200	R	B	E	....	S-P-W†	45	25	28	656
4-D157	A	M	4	4	3⅝ x 4⅜	24-30	1600-1800	R	B	E	....	S-C	50	26	31	1100
4-D277	A	M	4	4	4 x 5½	50-66	2000-2200	R	B	E	....	S-C	56	26	39	1440
6-D427	A	M	4	6	4⅛ x 4⅞	110-130	2200-2400	R	B	E	....	S-C	67	28	33	1650
6-D572	A	M	4	6	4¾ x 5⅜	135-150	2200-2400	R	B	E	....	S-C	70	32	42	2510
6-D802	A	M	4	6	5⅛ x 5½	157-190	2000-2200	R	B	E	....	C	82	31	43	2900

*All data is for complete marine units. * Continuous—Intermittent Ratings. † W—Warner Hydraulic.*

Harnischfeger Corporation, P & H Diesel Engine Division, 500 South Main Street, Crystal Lake, Illinois

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
387H-18	A	M-S-P	2	3	4½ x 5½	103	1800	R	....	E	M	S-T-C	39	29	41	1350
387H-18T	A	M-S-P	2	3	4½ x 5½	142	1800	R	....	E	M-T	S-T-C	39	29	41	1390
487H-18	A	M-S-P	2	4	4½ x 5½	144	1800	R	....	E	M	S-T-C	46	29	41	1530
487H-18T	A	M-S-P	2	4	4½ x 5½	186	1800	R	....	E	M-T	S-T-C	46	29	41	1590
687H-18	A	M-S-P	2	6	4½ x 5½	205	1800	R	....	E	M	S-T-C	60	29	41	1900
687H-18T	A	M-S-P	2	6	4½ x 5½	260	1800	R	....	E	M-T	S-T-C	60	29	41	1960

*Weights shown are for "P" units. * Intermittent horsepower ratings with all accessories not corrected to sealevel. All engines have scavenging blowers. "T" are turbocharged with blower and turbo in series.*

Hercules Motors Corporation, Canton, Ohio

Model†	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.††	Width In.	Height In.†††	Weight Lb.††††
DD-149**	A	M-S-P	4	3	3¾ x 4½	38	1800	R-B	....	E	....	....	32	21	32	550
DD-169**	A	M-S-P	4	3	4 x 4½	43	1800	R-B	....	E	....	....	32	21	32	550
DD198**	A	M-S-P	4	4	3¾ x 4½	53.2	1800	R-B	....	E	....	....	31	22	33	600
DD226**	A	M-S-P	4	4	4 x 4½	60.5	1800	R-B	....	E	....	....	31	22	33	600
DD298**	A	M-S-P	4	6	3¾ x 4½	79	1800	R-B	....	E	....	....	40	22	36	750
DD839**	A	M-S-P	4	6	4 x 4½	91	1800	R-B	....	E	....	....	40	22	36	750
C2-90D	B	M-S-P	4	2	4 x 3½	34.5	3000	..	B-HM	H-E	....	....	28	25	33	274
CV4-180	B	M-S-P	4	4	4 x 3½	71	3000	..	B-HM	E	....	....	23	28	35	463
GO-149	B	S-P	4	3	3¾ x 4½	38	1800	..	B-HM	H-E	....	....	32	21	32	475
GO-169	B	S-P	4	3	4 x 4½	43	1800	..	B-HM	H-E	....	....	32	21	32	475
ZXB	B	S-P	4	4	2⅝ x 3	15.7	2500	..	B-HM	H-E	....	....	24	17	17	179
IXLB	B	S-P	4	4	3¼ x 4¼	28	1800	..	B-HM	H-E	....	....	27	18	20	293
GO-198	B	S-P	4	4	3¾ x 4½	46.5	1800	..	B-HM	H-E	....	....	31	22	33	500
GO-226	B	S-P	4	4	4 x 4½	51.5	1800	..	B-HM	H-E	....	....	31	22	33	500
QXLD	B	S-P	4	6	3⅞ x 4¼	54.5	1800	..	B-HM	H-E	....	....	36	18	21	440
JXC	B	S-P	4	6	3¾ x 4¼	60.4	1800	..	B-HM	H-E	....	....	39	19	25	605
GO-298	B	S-P	4	6	3¾ x 4½	69	1800	..	B-HM	H-E	....	....	40	22	34	650
JXD	B	S-P	4	6	4 x 4¼	69.7	1800	..	B-HM	H-E	....	....	39	19	25	605
GO-339	B	S-P	4	6	4 x 4½	78	1800	..	B-HM	H-E	....	....	40	22	34	650
590-GVS	B	P	4	6	5 x 5	242***	2800	..	B	E	....	....	49¼	26¼	38¼	1275
590-GHI	B	P	4	6	5 x 5	242***	2800	..	B	E	....	....	50½	54	23	1275
590-BVI	B	P	4	6	5 x 5	255***	2800	..	B	E	....	....	50½	54	23	1275
590-GV4	B	P	4	6	5 x 5	242***	2800	..	B	....	....	....	49¼	26¼	38¼	1275
590-BHI	B	P	4	6	5 x 5	255***	2800	..	B	E	....	....	49¼	26¼	38¼	1275
590-0	B	S	4	6	5 x 5	232***	2800	..	B-HM	E-A	....	....	51¼	26¼	38¼	2160
779	B	P	4	6	5¼ x 6	254***	2200	..	B	E	....	....	71⅝	50½	28½	1800
6182-G2	B	P	4	6	5⅜ x 7	320***	2200	..	B	E	....	....	60½	30½	48⅝	2300
6182-B1	B	P	4	6	5⅜ x 7	365***	2200	..	B	E	....	....	60½	30½	48⅝	2300
6182-FE	B	P	4	6	5⅜ x 7	324***	2300	..	B	E	....	....	60½	30½	48⅝	2300
2269-0	B	S	4	12	5¾ x 7	545***	1800	..	HM	E-A-G	....	....	88	45	47¼	5400

** Hp and RPM are for continuous service; engines marked *** show intermittant horsepower and speed.*
*† Engines have turbulence-chamber combustion system. †† Lengths measured from bellhousing face to front support. ††† Heights measured from crankshaft to top of cylinder head cover. †††† Weights are approximate and include engine with fuel handling equipment only and no other accessories not forming an integral part of the engine. Various mounting arrangements, flywheel housings, oil pans, manifolds, starting motor and generator locations are available to meet specific applications requirements. ** Direct injection fuel system.*

Ingersoll-Rand Company, 11 Broadway, New York 4, N. Y.

Model	Type	Use	Cycle	No. Cyl.**	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
4-JVG	E	S	4	4	8¼ x 9	120	550	..	....	A	....	....	101	70	75	18510
6-JVG	E	S	4	6	8¼ x 9	180	550	..	....	A	....	....	101	95	75	26360
8-JVG	E	S	4	8	8¼ x 9	240	550	..	....	A	....	....	101	120	75	34680
6-SVG	E	S	4	6	11¾ x 12¾	330	400	..	....	A	....	....	132	138	100	36000
8-SVG	E	S	4	8	11¾ x 12¾	440	400	..	....	A	....	....	132	177	100	47000
10-SVG	E	S	4	10	11¾ x 12¾	550	400	..	....	A	....	....	132	193	102	53000
12-SVG	E	S	4	12	11¾ x 12¾	660	400	..	....	A	....	....	132	206	102	63000
26-KVG	E	S	4	6	15¼ x 18	660	330	..	....	A	....	....	197	154	122	69000
36-KVG	E	S	4	6	15¼ x 18	660	330	..	....	A	....	....	197	184	122	79000
48-KVG	E	S	4	8	15¼ x 18	880	330	..	....	A	....	....	197	228	122	99000
410-KVG	E	S	4	10	15¼ x 18	1100	330	..	....	A	....	....	197	266	122	111000
412-KVG	E	S	4	12	15¼ x 18	1320	330	..	....	A	....	....	197	266	122	120000
512-KVG	E	S	4	12	15¼ x 18	1320	330	..	....	A	....	....	197	284	122	129000
26-KVS	E	S	4	6	15¼ x 18	1000	330	..	....	A	T	....	197	154	145	70000
36-KVS	E	S	4	6	15¼ x 18	1000	330	..	....	A	T	....	197	184	145	80000
48-KVS	E	S	4	8	15¼ x 18	1320	330	..	....	A	T	....	197	228	145	100000
412-KVS	E	S	4	12	15¼ x 18	2000	330	..	....	A	T	....	197	266	145	121000
512-KVS	E	S	4	12	15¼ x 18	2000	330	..	....	A	T	....	197	284	145	130000
512-KVT	E	S	4	12	16 x 22	3000	330	..	....	A	T	....	263	403	158	250000
616-KVT	E	S	4	16	16 x 22	4000	330	..	....	A	T	....	263	526	158	303000
512-KVH	E	S	4	12	16 x 22	3500	330	..	....	A	T	....	241	428	144	253000
616-KVH	E	S	4	16	16 x 22	4500	330	..	....	A	T	....	241	549	144	306000
4-SVO	A†	S	4	4	11¾ x 12¾	200	400	..	....	A	....	....	132	99	100	33700
6-SVO	A†	S	4	6	11¾ x 12¾	300	400	..	....	A	....	....	132	139	100	46400
8-SVO	A†	S	4	8	11¾ x 12¾	400	400	..	....	A	....	....	132	178	100	59900
10-SVO	A†	S	4	10	11¾ x 12¾	500	400	..	....	A	....	....	132	193	102	66300
12-SVO	A†	S	4	12	11¾ x 12¾	600	400	..	....	A	....	....	132	208	102	77800
412-KVO	A†	S	4	12	15¼ x 18	1320	330	..	....	A	....	....	197	266	122	120000
PJVG-6	B	S	4	6	8¼ x 9	220	720	..	....	A	....	....	87	58	78	9900
PJVG-8	B	S	4	8	8¼ x 9	295	720	..	....	A	....	....	103	58	78	12800
PSVG-6	B	S	4	6	11¾ x 12¾	408	514	..	....	A	....	....	121	76	101	30000
PSVG-8	B	S	4	8	11¾ x 12¾	544	514	..	....	A	....	....	150	76	101	38500
PSVG-10	B	S	4	10	11¾ x 12¾	680	514	..	....	A	....	....	178	76	103	43800
PSVG-12	B	S	4	12	11¾ x 12¾	816	514	..	....	A	....	....	205	76	103	49100
PKVG-8	B	S	4	8	15¼ x 18	880	327	..	....	A	....	....	173	96	121	70500

Ingersoll-Rand Company, 11 Broadway, New York 4, N. Y. (Continued)

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
PKVG-10	B	S	4	10	15¼ x 18	1100	327	..	....	A	....	....	202	96	121	79000
PKVG-12	B	S	4	12	15¼ x 18	1320	327	..	....	A	....	....	229	96	121	95000
PKVG-16	B	S	4	16	15¼ x 18	1760	327	..	....	A	....	....	284	96	121	126000
PKVS-6	B	S	4	6	15¼ x 18	1000	327	..	....	A	T	....	....	....	....	.....
PKVS-12	B	S	4	12	15¼ x 18	2000	327	..	....	A	T	....	....	....	....	.....
PKVT-12	B	S	4	12	16 x 22	3000	327	..	....	A	T	....	....	....	....	.....
PKVT-16	B	S	4	16	16 x 22	4000	327	..	....	A	T	....	....	....	....	.....
PKVH-12	B	S	4	12	16 x 22	3500	327	..	....	A	T	....	....	....	....	.....
PKVH-16	B	S	4	16	16 x 22	4500	327	..	....	A	T	....	....	....	....	.....

***No. of power cylinders* **Horsepowers are continuous* *†Integrally-built diesel engine compressors*

International Harvester Company, 180 No. Michigan Avenue, Chicago 1, Illinois

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.†	Width In.†	Height In.†	Weight Lb.†
DU-66-D	A	S-P	4	2	3¼ x 4	14	2000	G	....	E	....	....	22	21	31	408
DU-74-D	A	S-P	4	2	3 7/16 x 4	16	2000	G	....	E	....	....	22	21	31	410
DU-99-D	A	S-P	4	3	3¼ x 4	21	2000	G	....	E	....	....	26	24	30	520
DU-111-D	A	S-P	4	3	3 7/16 x 4	22	2000	G	....	E	....	....	26	24	30	524
DU-132-D	A	S-P	4	4	3¼ x 4	35	2400	G	....	E	....	....	30	23	31	589
UD-166	A	S-P	4	4	3 11/16 x 3⅝	47	2400	..	....	E	....	....	32	21	32	570
UD-370	A	S-P	4	4	4⅝ x 5½	95	2200	O	....	E-G	....	....	42	24	43	1600
UD-14A	A	S-P	4	4	4¾ x 6½	101	1650	O	....	E-G	....	....	48	29	45	2171
UD-236	A	S-P	4	6	3 11/16 x 3 11/16	70	2400	R	....	E	....	....	40	22	30	905
UD-282	A	S-P	4	6	3 11/16 x 4.39	90	2400	R	....	E	....	....	40	22	30	905
UD-554	A	S-P	4	6	4⅝ x 5½	140	2300	O	....	E-G	....	....	57	31	44	2190
UD-691	A	S-P	4	6	4¾ x 6½	141	1600	O	....	E-G	....	....	61	32	50	3211
UD-817	A	S-P	4	6	5⅝ x 6	240	2100	O	....	E	....	....	62	40	53	3300
UDT-817	A	S-P	4	6	5⅝ x 6	375	2100	O	....	E	T	....	62	40	57	3500
UD-1091	A	S-P	4	6	5¾ x 7	216	1500	O	....	E-G	....	....	71	33	56	4095
UDT-1091	A	S-P	4	6	5¾ x 7	265	1500	O	....	E-G	T	....	71	33	56	4180
UC-135	B	S-P	4	4	3¼ x 4 1/16	38	2000	..	B	E	....	....	31	17	32	525
UC-221	B	S-P	4	6	3 1/16 x 3 11/16	65	2400	..	B	E	....	....	42	24	31	895
UC-263	B	S-P	4	6	3 1/16 x 4.39	79	2400	..	B	E	....	....	42	24	31	895
UB-220	B	S-P	4	6	3 1/16 x 3 11/16	80	2800	..	B	E	....	....	41	20	34	810
UB-264	B	S-P	4	6	3 11/16 x 4⅛	95	2800	..	B	E	....	....	41	20	34	815
U-308	B	S-P	4	6	3 13/16 x 4½	82	2400	..	B	E	....	....	43	22	36	825
U-372	B	S-P	4	6	4⅛ x 4⅛	92	2200	..	B	E	....	....	48	25	38	1240
U-450	B	S-P	4	6	4⅛ x 5	112	2200	..	B	E	....	....	48	26	38	1250
U-501	B	S-P	4	6	4½ x 5¼	120	2200	..	B	E	....	....	48	26	38	1320
UR-372	B	S-P	4	6	4⅛ x 4⅛	118	2600	..	B	E	....	....	49	27	39	1240
UR-450	B	S-P	4	6	4⅛ x 5	125	2400	..	B	E	....	....	49	27	39	1250
UR-501	B	S-P	4	6	4½ x 5¼	129	2200	..	B	E	....	....	49	27	39	1320
U-1091	B	S-P	4	6	5¾ x 7	248	1600	..	B	E	....	....	71	32	56	3825
UV-401	B	S-P	4	8	4½ x 3⅝	142	2800	..	B	E	....	....	38	37	41	1310
UV-461	B	S-P	4	8	4½ x 4 1/16	162	2600	..	B	E	....	....	38	37	41	1320
UV-549	B	S-P	4	8	4½ x 4 1/16	192	2600	..	B	E	....	....	38	37	41	1350

**Intermittent HP—Horsepower shown is for complete engine without fan and radiator at sea level.* *†Dimensions and weights are from fan to back face of flywheel housing and do not include PTO or air cleaner.*

Kahlenberg Brothers Company, 1707-12th Street, Two Rivers, Wisconsin

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
AD	A	M-S	2	2	8½ x 9	30–36	400	O	....	A	....	O	...	...	...	5450
AT	A	M-S	2	3	8½ x 9	45–54	400	O	....	A	....	O-D	...	...	...	6500
AF	A	M-S	2	4	8½ x 9	60–70	400	O	....	A	....	O-D	...	...	...	8200
BD	A	M-S	2	2	10 x 10½	50–60	375	O	....	A	....	O	...	...	...	7300
BT	A	M-S	2	3	10 x 10½	90	375	O	....	A	....	O–D	...	...	...	9700
BF	A	M-S	2	4	10 x 10½	120	375	O	....	A	....	O–D	...	...	...	11980
B5	A	M-S	2	5	10 x 10½	150	375	O	....	A	....	O–D	...	...	...	15650
B6	A	M-S	2	6	10 x 10½	180	375	O	....	A	....	O–D	...	...	...	17050
CT	A	M-S	2	3	12½ x 14	150	325	O	....	A	....	O–D	...	...	...	21730
CF	A	M-S	2	4	12½ x 14	200	325	O	....	A	....	O–D	...	...	...	23900
C5	A	M-S	2	5	12½ x 14	250	325	O	....	A	....	†D	...	...	...	29000
C6	A	M-S	2	6	12½ x 14	300	325	O	....	A	....	†D	...	...	...	34000
E4	A	M-S	2	4	10½ x 16	400–532	300–400	..	....	A	T	†D	115	76	79	22000
E6	A	M-S	2	6	10½ x 16	600–800	300–400	..	....	A	T	†D	146	76	79	30000
E8	A	M-S	2	8	10½ x 16	800–1065	300–400	..	....	A	T	†D	177	76	79	38000

**Continuous HP.* *†Reduction gear optional.*

Lufkin Foundry & Machine Co., Lufkin, Texas

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
H833	B	S	2	2	5½ x 7	20–30	425–650	..	HM	E-A	....	....	59	53	52	3200
H795	B	S	2	2	7½ x 9	45–65	400–600	..	HM	E-A	....	....	76	68	60	4250
H1770	B	S	2	2	9 x 12½	60–120	200–475	..	LM	E-A	....	....	96	88	73	10000
H2165	B	S	2	2	10½ x 12½	75–145	200–475	..	LM	E-A	....	....	96	88	73	12500

*Continuous HP

Mack Trucks Inc., 1355 W. Front St., Plainfield, New Jersey

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
END673	A	P	4	6	4⅞ x 6	170	2100	B	....	E-A	....	....	51	27	45	1917
ENDL673	A	P	4	6	4¾ x 6	170	2100	B	....	E-A	....	....	51	27	45	1837
ENDT673	A	P	4	6	4⅞ x 6	205	2100	B	....	E-A	T	....	51	31	45	2032
ENDLT673	A	P	4	6	4⅞ x 6	205	2100	B	....	E-A	T	....	51	31	45	1952

*Continuous HP

(Repeated from last year)

Minneapolis-Moline Company, Minneapolis 1, Minnesota

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
206H-4A	B†	S-P	4	4	3⅝ x 5	21–45	800-1500	..	B-HM	E	....	....	38	21	36	900
283-4A	D	S-P	4	4	4¼ x 5	32–59	800-1400	B	B-HM	E	....	....	46	25	46	1400
403-4A	B	S-P	4	4	4½ x 6	52–79	800-1300	..	B-HM	E	....	....	46	25	46	1590
425A-6A	D	S-P	4	6	4¼ x 5	48–85	800-1400	B	B-HM	E	....	....	60	25	48	2100
605A-6A	D	S-P	4	6	4½ x 6	72–100	800-1200	B	B-HM	E	....	....	60	29	54	2500
800-6A	B†	S-P	4	6	5¼ x 6	98–148	800-1300	..	B-HM	E	....	....	60	29	54	3125
D283-4A	A	S-P	4	4	4¼ x 5	28–46	800-1300	B	....	E	....	....	...	...	...	.....
D425-6A	A	S-P	4	6	4¼ x 5	42–77	800-1400	B	....	E	....	....	...	...	...	.....
D605-6A	A	S-P	4	6	4¾ x 6	66–95	800-1400	B	....	E	....	....	...	...	...	.....

** Continuous HP † Type "B" engine includes gasoline, natural gas, LPG and tractor fuel.*

Murphy Diesel Company, 5317 West Burnham Street, Milwaukee, Wisconsin

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
ME4	A	P-M	4	4	5¾ x 6½	105–150	1200	O	....	E-GA	....	....	71	43	65	3850
MP-11	A	P-M	4	4	5¾ x 6½	112–155	1200	O	....	E-GA	....	....	71	43	65	3850
MP-12	A	P-M	4	4	6 x 6½	120–165	1200	O	....	E-GA	....	....	71	43	65	3850
MP-20†	C	P-M	4	6	5½ x 6½	147–200	1200	O	....	E-GA	....	....	93	43	65	4700
MP-120	A	P-M	4	6	5½ x 6½	155–210	1200	O	....	E-GA	T	....	93	43	65	4800
MP-21†	C	P-M	4	6	5¾ x 6½	160–220	1200	O	....	E-GA	....	....	93	43	65	4700
MP-22†	C	P-M	4	6	6 x 6½	176–250	1200	O	....	E-GA	....	....	93	43	65	4700
MP-121	A	P-M	4	6	5¾ x 6½	185–245	1200	O	....	E-GA	....	....	93	43	65	4800
MP-122	A	P-M	4	6	6 x 6½	205–275	1200	O	....	E-GA	T	....	93	43	65	4800
MP-24†	C	P-M	4	6	6⅜ x 6½	200–280	1200	O	....	E-GA	T	....	93	43	65	4700
MP-324	A	P-M	4	6	6⅜ x 6½	245–320	1400	O	....	E-GA	T	....	93	43	65	4800
MP-111	A	PS	4	4	5¾ x 6½	125–170	1200	O	....	AEG	T	....	71	43	65	3850
MP-112	A	PS	4	4	6 x 6½	140–190	1200	O	....	AEG	T	....	71	43	65	3850
MP-211	A	PS	4	4	5¾ x 6½	120–165	1400	O	....	AEG	....	....	71	43	65	3800
MP-212	A	PS	4	4	6 x 6½	130–175	1400	O	....	AEG	....	....	71	43	65	3800
MP-311	A	PS	4	4	5¾ x 6½	135–185	1400	O	....	AEG	T	....	71	43	65	3850
MP-312	A	PS	4	4	6 x 6½	145–195	1400	O	....	AEG	T	....	71	43	65	3850
MP-124	A	PS	4	6	6⅜ x 6½	225–305	1200	O	....	AEG	T	....	93	43	65	4800
MP-220†	A	PS	4	6	5½ x 6½	160–215	1400	O	....	AEG	....	....	93	43	65	4700
MP-320	A	PS	4	6	5½ x 6½	170–230	1400	O	....	AEG	T	....	93	43	65	4800
MP-221†	A	PS	4	6	5¾ x 6½	180–235	1400	O	....	AEG	....	....	93	43	65	4700
MP-222†	A	PS	4	6	6 x 6½	195–270	1400	O	....	AEG	....	....	93	43	65	4700
MP-321	A	PS	4	6	5¾ x 6½	200–260	1400	O	....	AEG	T	....	93	43	65	4800
MP-224†	A	PS	4	6	6⅜ x 6½	220–300	1400	O	....	AEG	....	....	93	43	65	4700
MP-322	A	PS	4	6	6 x 6½	220–295	1400	O	....	AEG	T	....	93	43	65	4800

All engines have open-type combustion chambers and unit injectors. Marine engines carry different model numbers, weights and dimensions. Ratings shown are with power consuming accessories and corrected to 29.92-in. & 60°F.
** Continuous—maximum HP. † When this Model No. is followed by designation "G", engine is dual-fuel and the continuous rating applies.*

Nordberg Manufacturing Co., Milwaukee, Wisconsin

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
4FS-1	A	S-P	4	1	4½ x 5¼	10–15	1200-1800	B	....	E-H	....	....	...	...	...	.....
4FG-1	B	S	4	1	4½ x 5¼	8–18	800-1800	..	HM	E-H	....	....	...	...	...	.....
4FS-2	A	S-P	4	2	4½ x 5¼	20–30	1200-1800	B	....	E-H	....	....	...	...	...	.....
4FG-2	B	S	4	2	4½ x 5¼	16–36	800-1800	..	HM	E-H	....	....	...	...	...	.....
4FS-3	A	S-P	4	3	4½ x 5¼	30–45	1200-1800	B	....	E-H	....	....	...	...	...	.....
4FS-3	B	S	4	3	4½ x 5¼	24–48	800-1800	..	HM	E-H	....	....	...	...	...	.....
FS-96-HSC**	D	M-S	4	6	9 x 11½	540–720	720-900	S	LM	A	T	D	...	...	...	.....
FS-98-HSC**	D	M-S	4	8	9 x 11½	715–960	720-900	S	LM	A	T	D	...	...	...	.....
FS-136-HSC**	D	M-S	4	6	13–13½ x 16½	1200–1750	450-550	S	P	A	T	D	...	...	...	.....
FS-138-HSC**	D	M-S	4	8	13–13½ x 16½	1600–2325	450-550	S	P	A	T	D	...	...	...	.....
FS-1312-HSC**	D	M-S	4	12	13–13½ x 16½	2400–3500	450-550	S	P	A	T	D	...	...	...	.....
FS-1316-HSC**	D	M-S	4	16	13–13½ x 16½	3200–4650	450-550	S	P	A	T	D	...	...	...	.....
RTS-1412***†	D	S	2	12	14 x 16	2125–3200	400-450	B	P	A	....	....	...	...	...	.....
TS-215-31†	C	M-S	2	5	21½ x 31	2550–2925	240-257	B	....	A	....	D	...	...	...	.....
TS-216-31†	C	M-S	2	6	21½ x 31	3050–3500	240-257	B	....	A	....	D	...	...	...	.....
TS-217-31†	C	M-S	2	7	21½ x 31	3575–4100	240-257	B	....	A	....	D	...	...	...	.....
TS-218-31†	C	M-S	2	8	21½ x 31	4075–4675	240-257	B	....	A	....	D	...	...	...	.....
TS-219-31†	C	M-S	2	9	21½ x 31	4600–5275	240-257	B	....	A	....	D	...	...	...	.....
TS-2110-31†	C	M-S	2	10	21½ x 31	5100–5850	240-257	B	....	A	....	D	...	...	...	.....
TS-2112-31†	C	M-S	2	12	21½ x 31	6160–7025	240-257	B	....	A	....	D	...	...	...	.....
TS-296†	C	M-S	2	6	29 x 40	5670–6400	189-200	B	....	A	....	D	...	...	...	.....
TS-297†	C	M-S	2	7	29 x 40	6620–7500	189-200	B	....	A	....	D	...	...	...	.....
TS-298†	C	M-S	2	8	29 x 40	7570–8500	189-200	B	....	A	....	D	...	...	...	.....
TS-299†	C	M-S	2	9	29 x 40	8500–9600	189-200	B	....	A	....	D	...	...	...	.....
TS-2910†	C	M-S	2	10	29 x 40	9450–10600	189-200	B	....	A	....	D	...	...	...	.....
TS-2912†	C	M-S	2	12	29 x 40	11350–12800	189-200	B	....	A	....	D	...	...	...	.....

**Engines are designed to operate continuously at ratings shown and are good for 10 per cent overload for 2 hr in any 24 hr period.*
*** Supairthermal execution *** Radial Engine † Supercharged ratings are approximately 40% higher.*

Oliver Corporation, 300 Lawler St., Charles City, Iowa

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
Super 166D	A	S-M-P	4	4	3⅝ x 3¾	....	1800	B	....	E	....	**	40	22	39	781
Super 177D	A	S-M-P	4	6	3½ x 3¾	39.0	1800	B	....	E	....	**	49	22	39	950
Super 188D	A	S-M-P	4	6	3¾ x 4	48.0	1800	B	....	E	....	**	52	24	47	1108
Super 199D	A	S-M-P	4	6	4 x 4	57.0	1800	B	....	E	....	**	52	24	47	1165
Super 166HC	B	S-P	4	4	3⅝ x 3¾	....	1800	..	B-HM	E	....	**	40	22	39	728
Super 177HC	B	S-P	4	6	3½ x 3¾	40.6	1800	..	B-HM	E	....	**	49	22	39	913
Super 188HC	B	S-P	4	6	3¾ x 4	49.0	1800	..	B-HM	E	....	**	52	24	47	1035
Super 199HC	B	S-P	4	6	4 x 4	57.1	1800	..	B-HM	E	....	**	52	24	47	1088

** Continuous HP. ** Reverse Gear Available.*

R. H. Sheppard Company, Inc., Hanover, Pennsylvania

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
17B	A	M-S-P	4	2	3½ x 4	25	1800	O	....	E	....	P	25	18	26	435
17D	A	M-S-P	4	2	3⅞ x 4	30	1800	O	....	E	....	P	25	18	26	435
19B	A	M-S-P	4	4	3½ x 4	50	1800	O	....	E	....	P	39	18	26	600
19D	A	M-S-P	4	4	3⅞ x 4	60	1800	O	....	E	....	P	39	18	26	600
16B	A	M-S-P	4	4	4½ x 5	88	1800	O	....	E	....	P	47	22	46	1600

**Maximum HP*

Sterling Engine Company, Inc., Menominee, Michigan

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
VD-6	A	M-S	4	6	8 x 9	420	1200	B-S	....	A-E	....	....	95	40	64	8500
VD-6-S	A	M-S	4	6	8 x 9	750	1200	B	....	A-E	T	....	115	40	64	9160
VD-8-S	A	S	4	8	8 x 9	1000	1200	B	....	A-E	T	....	136	40	64	12450
LC-6	B	S	4	6	5¼ x 6	72–110	800–2000	..	B	E	....	....	57	33	42	2200
TC-6	B	S	4	6	8 x 9	260–450	700–1200	..	B	A-E	....	....	101	45	64	6900
TC-8	B	S	4	8	8 x 9	365–600	700–1200	..	B	A-E	....	....	122	45	64	9000

*Weights and dimensions are given for "S" units. *Horsepower listings indicate continuous and intermittent ratings.*

Union Diesel Engine Company, Oakland 6, Calif.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
GA6	D	M-S	4	6	8½ x 11	150–250	450–600	O	....	A	....	D	114	34	72	12500
GA6S	D	M-S	4	6	8½ x 11	225–375	450–600	O	....	A	T	D	117	34	72	13500
L6	D	M-S	4	6	10 x 14	210–380	360–514	O	....	A	....	D	135	42	85	20000
L6S	D	M-S	4	6	10 x 14	315–570	360–514	O	....	A	T	D	135	42	85	21000
P6	D	M-S	4	6	12 x 15	290–575	327–514	O	....	A	....	D	162	46	93	34500
P6S	D	M-S	4	6	12 x 15	440–875	327–514	O	....	A	T	D	166	46	93	36000
V6	D	M-S	4	6	14 x 19	400–780	277–400	O	....	A	....	D	185	57	114	53000
V6S	D	M-S	4	6	14 x 19	640–1150	277–400	O	....	A	T	D	185	57	114	54500
Z6	D	M-S	4	6	16 x 20½	520–1015	240–360	O	....	A	....	D	203	62	125	80000
Z6S	D	M-S	4	6	16 x 20½	780–1500	240–360	O	....	A	T	D	203	62	125	82000
GA8	D	M-S	4	8	8½ x 11	200–335	450–600	O	....	A	....	D	144	34	72	16000
GA8S	D	M-S	4	8	8½ x 11	295–500	450–600	O	....	A	T	D	151	34	72	17000
L8	D	M-S	4	8	10 x 14	280–500	360–514	O	....	A	....	D	171	42	85	26000
L8S	D	M-S	4	8	10 x 14	420–750	360–514	O	....	A	T	D	171	42	85	26500
P8	D	M-S	4	8	12 x 15	390–775	327–514	O	....	A	....	D	198	46	93	45000
P8S	D	M-S	4	8	12 x 15	590–1165	327–514	O	....	A	T	D	202	46	93	46500
V8	D	M-S	4	8	14 x 19	565–1035	277–400	O	....	A	....	D	234	57	114	70000
V8S	D	M-S	4	8	14 x 19	860–1550	277–400	O	....	A	T	D	234	57	114	72000
Z8	D	M-S	4	8	16 x 20½	695–1320	240–360	O	....	A	....	D	259	62	125	98000
Z8S	D	M-S	4	8	16 x 20½	1040–2000	240–360	O	....	A	T	D	259	62	125	100000

**Continuous HP*

Waukesha Motor Company, Waukesha, Wisconsin

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	H P.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
ICK	B	S-P	4	4	2½ x 3½	14	2000	..	B-HM	H-E	....	....	22	13	21	195
FC	B	S-P	4	4	3¼ x 4	26	1800	..	B-HM	H-E	....	....	28	19	21	290
180GKB	B	S-P	4	4	3⅝ x 3⅝	48	2400	..	B-HM	H-E	....	....	31	19	28	450
180DLC	A	S-P	4	4	3½ x 3¾	31†	2000	B-R	....	H-E	....	....	31	19	28	475
XAH	B	S-P	4	4	3⅝ x 4½	35	1800	..	B-HM	H-E	....	....	33	19	27	385
185GLB	B	S-P	4	6	3½ x 3¾	50	2000	..	B-HM	H-E	....	....	31	22	30	675
185DLC	A	S-P	4	6	3½ x 3¾	44	2000	B-R	....	H-E	....	....	31	22	30	675
190GLB	B	S-P	4	6	3¾ x 4	60	2000	..	B-HM	H-E	....	....	43	22	30	690
190DLCA	A	S-P	4	6	3¾ x 4	58†	2000	B-R	....	H-E	....	....	43	22	29	768
195GL	B	S-P	4	6	4 x 4	65	2000	..	B-HM	H-E	....	....	43	22	30	775
195DLCA	A	S-P	4	6	4 x 4	67†	2000	B-R	....	E	....	....	43	26	30	865
197-DLCS	A	M-S-P	4	6	4 x 4	94	2200	R	....	H-E	T	....	44	26	40	890
195GK	B	S-P	4	6	4⅛ x 4	71	2000	..	B-HM	H-E	....	....	44	22	30	780
195-GKA	B	S-P	4	6	4⅛ x 4	73†	2000	..	B-HM	H-E	....	....	44	22	30	800
135-GKB	B	S-P	4	6	4¼ x 5	98†	2000	..	B-HM	E	....	....	47	26	38	1325
135DKB	A	S-P-M	4	6	4¼ x 5	99†	2000	G-B-R	....	E	....	....	48	26	35	1386
135DKBS	A	S-P-M	4	6	4¼ x 5	121†	2000	G-B-R	....	E	T	....	48	26	41	1486
135G-ZB	B	S-P	4	6	4⅝ x 5	104†	2000	..	B-HM	E	....	....	48	26	38	1325
140GKB	B	S-P	4	6	4½ x 5½	112†	1800	..	B-HM	E	....	....	52	26	43	1390
140-GZB	B	S-P	4	6	4⅝ x 5½	117†	1800	..	B-HM	E	....	....	52	26	43	1390
145GKB	B	S-P	4	6	5¼ x 6	160†	1800	..	B-HM	E-G	....	....	56	29	47	1810
148DKB	A	S-P-M	4	6	5¼ x 6	147†	1800	B	....	E-G	....	....	56	29	47	2320
148DKBS	A	S-P-M	4	6	5¼ x 6	194†	1800	B	....	E-G	T	....	56	29	56	2445
145GZB	B	S-P	4	6	5⅜ x 6	167†	1800	..	B-HM	E-G	....	....	56	29	47	1820
WAKB	B	S-P	4	6	6¼ x 6½	227†	1600	..	B-HM-LM	E-G-A	....	....	67	33	51	3150
WAKR	B	S-P	4	6	6¼ x 6½	217†	1600	..	B-HM-LM	E-G-A	....	....	67	33	51	3050
WAKDB	A	S-P-M	4	6	6¼ x 6½	195†	1600	B	....	E-G-A	....	....	67	33	51	3800
WAKDBS	A	S-P-M	4	6	6¼ x 6½	259†	1600	B	....	E-G-A	T	....	67	33	63	3925
NKRB	B	S-P	4	6	7 x 8¼	260†	1200	..	HM-LM	G-A	....	....	79	48	61	6900
NKDB	A	S-P-M	4	6	7 x 8¼	238†	1200	B	....	G-A	....	....	79	48	61	9285
NKDBS	A	S-P-M	4	6	7 x 8¼	312†	1200	B	....	G-A	T	....	79	48	61	9435
LRORB	B	S-P	4	6	8½ x 8½	372†	1200	..	HM-LM	G-A	....	....	98	49	70	9940
LRDB	A	S-P-M	4	6	8½ x 8½	332†	1200	B	....	G-A	....	....	98	49	70	10300
LRDBCS	A	S-P-M	4	6	8½ x 8½	556†	1200	B	....	G-A	T	....	114	49	70	10450
LRZB	B	S-P	4	6	9⅜ x 8½	475†	1200	..	HM-LM	G-A	....	....	114	60	73	11250
VLROB	B	S-P	4	12	8½ x 8½	720†	1200	..	LM	G-A	....	....	130	60	58	15000
VLRDB	A	S-P-M	4	12	8½ x 8½	725†	1200	B	....	G-A	....	....	130	60	58	15500
VLRDBS	A	S-P-M	4	12	8½ x 8½	990†	1200	B	....	G-A	T	....	134	60	58	16300

** Continuous hp ratings are based on 80 per cent of maximum at speeds indicated. Gas ratings on LPG; natural gas approx. 10 per cent lower.*
† Counter balanced crankshaft.

Roiline

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.†††
H570	B	S-P	4	8	4⅝ x 4½	218	2400	..	B-HM	E-A	....	....	81	40	64	2000
H884	B	S-P	4	8	5⅜ x 4⅞	300	2400	..	B-HM	E-A	....	....	88	50	74	3200
F1500	B	S-P	4	6	6¾ x 7	159	1100	..	HM††	G-A-E	....	....	115	50	84	5800
H2000	B	S	4	8	6¾ x 7	213	1100	..	HM††	G-A-E	....	....	88	52	72	5850
L3000	B	S	4	12	6¾ x 7	324	1100	..	HM††	G-A-E	....	....	111	60	84	8300
L3460	B	S	4	12	7¼ x 7	445	1200	..	HM††	G-A-E	....	....	167	66	86	12800
L4000	B	S	4	12	7.64 x 7.5	493	1200	..	HM††	G-A-E	....	....	169	66	91	12850

**Continuous HP †Distributor available. ††LM available. †††Lighter automotive units available. Weights are given for stationary units (dry).*

White Diesel Engine Division, The White Motor Company, Springfield, Ohio

Superior Engines

Model	Type	Use	Cycle	No. Cyl	Bore & Stroke In.	HP*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight lb.
6G-510	B	S-P	4	6	8½ x 9	190–450	600–1200	..	HM	A-G	....	....	....	....	....	.....
6G-825	B	S-P	4	6	10 x 10½	300–600	600–900	..	HM	A-G	....	....	....	....	....	.....
6GX-510	B	S-P	4	6	8½ x 9	300–600	600–1200	..	HM	A-G	T	....	....	....	....	.....
6GX-825	B	S-P	4	6	10 x 10½	490–730	600–900	..	HM	A-G	T	....	....	....	....	.....
8G-825	B	S-P	4	8	10 x 10½	400–800	600–900	..	HM	A-G	....	....	....	....	....	.....
8GX-825	B	S-P	4	8	10 x 10½	650–975	600–900	..	HM	A-G	T	....	....	....	....	.....
40-6	D	M-S-P	4	6	8½ x 10½	215–460	600–1100	B-S	....	A	....	....	....	....	....	.....
40-8	D	M-S-P	4	8	8½ x 10½	290–620	600–1100	B-S	....	A	....	....	....	....	....	.....
40X-6	D	M-S-P	4	6	8½ x 10½	325–800	600–1100	B-S	....	A	T	....	....	....	....	.....
40X-8	D	M-S-P	4	8	8½ x 10½	435–1025	600–1100	B-S	....	A	T	....	....	....	....	.....
40-6	D	M-S-P	4	6	9¼ x 10½	215–460	600–1100	B-S	....	A	....	....	....	....	....	.....
40-8	D	M-S-P	4	8	9¼ x 10½	290–620	600–1100	B-S	....	A	....	....	....	....	....	.....
40X-6	D	M-S-P	4	6	9¼ x 10½	325–800	600–1100	B-S	....	A	T	....	....	....	....	.....
40X-8	D	M-S-P	4	8	9¼ x 10½	435–1025	600–1100	B-S	....	A	T	....	....	....	....	.....
60-6	D	M-S	4	6	12 x 15	370–620	360–600	B	....	A	....	....	....	....	....	.....
60-8	D	M-S	4	8	12 x 15	495–700	360–514	B	....	A	....	....	....	....	....	.....
60X-6	D	M-S	4	6	12 x 15	700–1160	360–600	S	....	A	T	....	....	....	....	.....
60X-8	D	M-S	4	8	12 x 15	960–1320	360–514	S	....	A	T	....	....	....	....	.....
65-6	D	M-S	4	6	12¾ x 15	580–720	500–600	S	....	A	....	....	....	....	....	.....
65-8	D	M-S	4	8	12¾ x 15	775–960	500–600	S	....	A	....	....	....	....	....	.....
65X-6	D	M-S	4	6	12¾ x 15	1105–1600	500–600	S	....	A	T	....	....	....	....	.....
65X-8	D	M-S	4	8	12¾ x 15	1470–2150	500–600	S	....	A	T	....	....	....	....	.....
80-6	D	M-S	4	6	14½ x 20	600–850	300–375	S	HM	A	....	....	....	....	....	.....
80-8	D	M-S	4	8	14½ x 20	800–1150	300–375	S	HM	A	....	....	....	....	....	.....
80X-6	D	M-S	4	6	14½ x 20	900–1525	300–375	S	....	A	T	....	....	....	....	.....
80X-8	D	M-S	4	8	14½ x 20	1200–2000	300–375	S	....	A	T	....	....	....	....	.....

* *Continuous HP*

Atlas Engines

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
35-6	A	M-S-P	4	6	6¼ x 8¼	150–225	900–1250	B	....	A-E	..	....	...	...	...	.....
35X-6	A	M-S-P	4	6	6½ x 8¼	225–340	900–1250	B	....	A-E	T	....	...	...	...	.....
45-6	A	M-S-P	4	6	9 x 10½	240–300	600–750	B-S	....	A	....	....	...	...	...	.....
45-8	A	M-S-P	4	8	9 x 10½	320–400	600–750	B-S	....	A	....	....	...	...	...	.....
45X-6	A	M-S-P	4	6	9 x 10½	360–450	600–750	B-S	....	A	T	....	...	...	...	.....
45X-8	A	M-S-P	4	8	9 x 10½	480–600	600–750	B-S	....	A	T	....	...	...	...	.....
76-6	A	S	4	6	13 x 16	450–500	360–400	B	....	A	....	....	...	...	...	.....
76X-6	A	S	4	6	13 x 16	675–750	360–400	B	....	A	T	....	...	...	...	.....

* *Continuous HP*

White-Roth Machine Corporation—Lorain Engines, Lorain, Ohio

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
L	B	S	2	1	7½ x 8	27	600		HM	H-G	....	....	72	50	48	2810
LD	A	S	2	1	7½ x 8	23	600	S	....	G	....	....	72	50	48	2810
O	B	S	2	1	9½ x 10	42	500		HM	H-G	....	....	88	60	51	4300
OD	A	S	2	1	9½ x 10	34	500	S	....	G	....	....	88	60	51	4300
R	B	S	2	1	12 x 13	60	350	..	HM	G	....	....	112	71	66	8000
A	B	S	2	1	13 x 13	70	350	..	HM	G	....	....	112	72	66	8300
AD	A	S	2	1	13 x 13	55	350	S	....	G	....	....	112	72	66	8500

* *Continuous HP*

Witte Engine Works, Oil Well Supply Division, U. S. Steel Corporation, Kansas City 26, Missouri

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
AD	A	S-P	4	1	3¼ x 4½	4–5.5	1200–1500	B	....	H-E	....	....	24	24	33	450
BD-8	A	S-P	4	1	4¼ x 6	8	900	B	....	H-E	....	....	45	39	42	1151
BD-9	A	S-P	4	1	4¼ x 6	9	1000	B	....	H-E	....	....	45	39	42	1150
CD	A	S-P	4	1	5 x 8	12.5	750	B	....	H-E	....	....	53	49	49	1735
F-28	B	S-P	4	1	8 x 8	28	650	..	HM	E-G	....	....	62	53	54	3000
B-12	B	S-P	4	1	5 x 6	12	1000	..	HM	H-E	....	....	47	39	42	1285
C-15	B	S-P	4	1	6 x 8	15	750	....	HM	H-E	....	....	57	47	49	1760
C-19	B	S-P	4	1	6 x 8	19	750	....	HM	H-E	....	....	57	47	49	1760
98	B	S-P	4	1	5 x 5	10	1200		HM	H-E	....	....	39	36	36	655
100	A	M-SP	4	2	4 x 4	18.0	1800	B-R	..	E	....	....	29	39	26	700
F-42	B	S-P	4	1	8¾ x 8	42	750	....	HM	E-G	....	....	62	53	54	3000

**Continuous HP*

Worthington Corporation, Harrison, New Jersey

Model	Type	Use	Cycle	No. Cyl	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
SLHP-4	B	S-P	4	4	11½ x 12	440	514	..	....	A	T	....	....	....	....	.....
SLHP-5	B	S-P	4	5	11½ x 12	550	514	..	....	A	T	....	....	....	....	.....
SLHP-6	B	S-P	4	6	11½ x 12	660	514	..	....	A	T	....	....	....	....	.....
SLHP-7	B	S-P	4	7	11½ x 12	770	514	..	....	A	T	....	....	....	....	.....
SLHP-8	B	S-P	4	8	11½ x 12	880	514	..	....	A	T	....	....	....	....	.....
SLHP-10	B	S-P	4	10	11½ x 12	1100	514	..	....	A	T	....	....	....	....	.....
SDR5	D	S	4	5	13¼ x 17¼	1030	450	..	....	A	T	....	....	....	....	.....
SDR6	D	S	4	6	13¼ x 17¼	1235	450	..	....	A	T	....	....	....	....	.....
SDR7	D	S	4	7	13¼ x 17¼	1440	450	..	....	A	T	....	....	....	....	.....
SDR8	D	S	4	8	13¼ x 17¼	1645	450	..	....	A	T	....	....	....	....	.....
SEH5	D	S	4	5	16 x 20	1375	360	..	....	A	T	....	....	....	....	.....
SEH6	D	S	4	6	16 x 20	1650	360	..	....	A	T	....	....	....	....	.....
SEH7	D	S	4	7	16 x 20	1925	360	..	....	A	T	....	....	....	....	.....
SEH8	D	S	4	8	16 x 20	2200	360	..	....	A	T	....	....	....	....	.....
SW14-6	D	S	4	6	14 x 18	1875–2155	450–514	..	....	A	T	....	....	....	....	.....
SW14-8	D	S	4	8	14 x 18	2500–2875	450–514	..	....	A	T	....	....	....	....	.....
SW14-12	D	S	4	12	14 x 18	3750–4315	450–514	..	....	A	T	....	....	....	....	.....
SW14-16	D	S	4	16	14 x 18	5000–5755	450–514	..	....	A	T	....	....	....	....	.....
SLHC-4	E	S-P	4	4	11½ x 12	375	450	..	LM	A	T	....	....	....	....	.....
SLHC-5	E	S-P	4	5	11½ x 12	475	450	..	LM	A	T	....	....	....	....	.....
SLHC-6	E	S-P	4	6	11½ x 12	550	450	..	LM	A	T	....	....	....	....	.....
SLHC-7	E	S-P	4	7	11½ x 12	660	450	..	LM	A	T	....	....	....	....	.....
SLHC-8	E	S-P	4	8	11½ x 12	750	450	..	LM	A	T	....	....	....	....	.....
SLHC-10	E	S-P	4	10	11½ x 12	950	450	..	LM	A	T	....	....	....	....	.....
SUTC-5	E	S	2	5	16 x 16	1250	300	..	P	A	T	....	....	....	....	.....
SUTC-6	E	S	2	6	16 x 16	1500	300	..	P	A	T	....	....	....	....	.....
SUTC-7	E	S	2	7	16 x 16	1750	300	..	P	A	T	....	....	....	....	.....
SUTC-8	E	S	2	8	16 x 16	2000	300	..	P	A	T	....	....	....	....	.....
SUTC-10	E	S	2	10	16 x 16	2500	300	..	P	A	T	....	....	....	....	.....

* *Continuous HP. Increased horsepower is available on some models. Minor variations of bores and strokes can be made for special applications.*

Imported Diesels

Foreign engines listed are limited to those of manufacturers with active sales representation in this country.

Burmeister & Wain American Corporation, Mystic, Conn.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.†	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
20MT-30	A	S	4	2-6	7.9 x 11.8	35*	600	O	....	A	....	....	...	...	...	.....
20MTB-30	A	S	4	3-6	7.9 x 11.8	50*	600	O	....	A	T	....	...	...	...	.....
25MT-40	A	S	4	2-7	9.8 x 15.7	60*	500	O	....	A	....	....	...	...	...	.....
25MTB-40	A	S	4	3-7	9.8 x 15.7	85*	500	O	....	A	T	....	...	...	...	.....
33MT-48	A	M-S	4	3-7	13.0 x 18.9	100*	400	O	....	A	....	D	...	...	...	.....
28V-50	A	M-S	2	4-9	11.0 x 19.7	122*	360	O	....	A	....	D††	...	...	...	.....
33MTB-48	A	M-S	4	3-7	13.0 x 18.9	140*	400	O	....	A	T	D	...	...	...	.....
28VB-50	A	M-S	2	5-9	11.0 x 19.7	175*	360	O	....	A	T	D††	...	...	...	.....
35V-62	A	M-S	2	4-10	13.8 x 24.4	200*	300	O	....	A	....	D	...	...	...	.....
42V-75	A	M-S	2	4-10	16.5 x 29.5	240*	240	O	....	A	....	D	...	...	...	.....
35VB-62	A	M-S	2	5-10	13.8 x 24.4	270*	300	O	....	A	T	D	...	...	...	.....
42VB-75	A	M-S	2	5-10	16.5 x 29.5	324*	240	O	....	A	T	D	...	...	...	.....
50V-90	A	M-S	2	4-10	19.7 x 35.4	410*	200	O	....	A	....	D	...	...	...	.....
50VT-110	A	M-S	2	4-10	19.7 x 43.3	420*	170	O	....	A	....	D	...	...	...	.....
50VB-90	A	M-S	2	5-10	19.7 x 35.4	554*	200	O	....	A	T	D	...	...	...	.....
50VTB-110	A	M-S	2	5-10	19.7 x 43.3	567*	170	O	....	A	T	D	...	...	...	.....
74T-150	A	M-S	4	6-10	29.1 x 59.0	575*	120	O	....	A	....	D	...	...	...	.....
50VT-110/40	A	M-S	2	4-10	19.7 x 43.3/15.7	585*	170	O	....	A	....	D	...	...	...	.....
62V-115	A	M-S	2	4-10	24.4 x 45.3	600*	150	O	....	A	....	D	...	...	...	.....
62VT-115	A	M-S	2	4-10	24.4 x 45.3	600*	150	O	....	A	....	D	...	...	...	.....
62VT-140	A	M-S	2	4-12	24.4 x 55.1	555*	135	O	....	A	....	D	...	...	...	.....
50VBT-110/40	A	M-S	2	5-10	19.7 x 43.3/15.7	790*	170	O	....	A	T	D	...	...	...	.....
62VB-115	A	M-S	2	5-10	24.4 x 45.3	810*	150	O	....	A	T	D	...	...	...	.....
62VTB-115	A	M-S	2	5-10	24.4 x 45.3	810*	150	O	....	A	T	D	...	...	...	.....
74VT-140	A	M-S	2	4-10	29.1 x 55.1	875*	125	O	....	A	....	D	...	...	...	.....
62VTB-140	A	M-S	2	5-12	24.4 x 55.1	900*	135	O	....	A	T	D	...	...	...	.....
74VT-160	A	M-S	2	5-12	29.1 x 63.0	920*	115	O	....	A	....	D	...	...	...	.....
74VTB-140	A	M-S	2	6-12	29.1 x 55.1	1190*	125	O	....	A	T	D	...	...	...	.....
75VT-150/50	A	M-S	2	4-10	29.5 x 59.0/19.7	1230*	120	O	....	A	....	D	...	...	...	.....
74VTB-160	A	M-S	2	5-12	29.1 x 63.0	1250*	115	O	....	A	T	D	...	...	...	.....
75VT-170/60	A	M-S	2	4-10	29.5 x 66.9/23.6	1300*	110	O	....	A	....	D	...	...	...	.....
75VTB-150/50	A	M-S	2	4-10	29.5 x 59.0/19.7	1650*	120	O	....	A	T	D	...	...	...	.....
75VTB-170/60	A	M-S	2	4-10	29.5 x 66.9/23.6	1755*	110	O	....	A	T	D	...	...	...	.....
84-VTB-180	A	M-S	2	4-10	33 x 70.8	1800*	110	O	....	A	T	D	...	...	...	.....
ALPHA-340	A	M	2	2-4	7.9 x 13.4	50*	450	O	....	A	....	††	...	...	...	.....
ALPHA-400	A	M	2	2-6	9.1 x 15.7	70*	375	O	....	A	....	††	...	...	...	.....
ALPHA-490	A	M	2	4-8	11½ x 19¼	120*	310	O	....	A	....	††	...	...	...	.....
BUKH-EV80	A	M-S-P	4	1	3.1 x 4.3	6*	1800	B	....	E-H**	....	....	...	...	...	.....
BUKH-EV100	A	M-S-P	4	1-8	3.9 x 5.1	12*	1800	B	....	E-H**	....	††	...	...	...	.....

†*Continuous HP.* **Hp per cylinder.* ****Also cartridge start.* ††*Controllable pitch propeller and sailing clutch of own manufacture. On models with dual stroke, shorter stroke is for exhaust piston.*

Daimler-Benz of N.A., Inc., Industrial Div., 126-56 Northern Blvd., Flushing 68, L. I., New York

Mercedes-Benz

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
M202B	A	M-S-P	4	2	5.5 x 8.25	55	1200	G	....	A-E-H	....	....	37	31	47	1590
M203B	A	M-S-P	4	3	5.5 x 8.25	90	1200	G	....	A-E	....	....	45	31	48	2160
M204B	A	M-S-P	4	4	5.5 x 8.25	120	1200	G	....	A-E	....	....	55	31	53	2715
OM636	A	M-S-P	4	4	2.938 x 3.938	35-43	3000-3500	G	....	E	....	P	28	21	30	400
OM312	A	M-S-P	4	6	3.563 x 4.75	77-100	2400-3000	G	....	E	....	C	37	27	43	808
OM321	A	M-S-P	4	6	3.75 x 4.75	94-110	2600-3000	G	....	E	....	C	37	27	43	784
OM315	A	M-S-P	4	6	4.438 x 5.5	124-145	1800-2100	G	....	E	....	C	54	31	45	1775
MB846A	A	M-S-P	4	6	5.875 x 7.5	250	1500	G	....	A-E	....	....	74	31	56	4075
MB846B†	A	M-S-P	4	6	5.875 x 7.5	250	1500	G	....	A-E	....	....	69	64	29	4200
MB846Ab	A	M-S-P	4	6	5.875 x 7.5	320	1500	G	....	A-E	T	....	86	35	85	4298
MB846Bb†	A	M-S-P	4	6	5.875 x 7.5	320	1500	G	....	A-E	T	....	86	60	29	4640
MB836B	A	M-S-P	4	6	6.875 x 8.063	375	1500	G	....	A-E††	....	....	76	41	55	4380
MB836Bb	A	M-S-P	4	6	6.875 x 8.063	500	1500	G	....	A-E††	T	....	84	41	64	4830
MB836Db	A	M-S-P	4	6	6.875 x 8.063	650	1500	G	....	A-E††	T**	....	90	41	64	4290
MB820B	A	M-S-P	4	V-12	6.875 x 8.063	700	1500	G	....	A-E††	....	....	95	55	61	6180
MB820Bb	A	M-S-P	4	V-12	6.875 x 8.063	1100	1500	G	....	A-E††	T	....	95	56	77	6900
MB820Db	A	M-S-P	4	V-12	6.875 x 8.063	1350	1500	G	....	A-E††	T**	....	95	54	73	7240
MB837A	A	M-S-P	4	V-8	6.5 x 6.891	425-480	2000-2200	G	....	E	....	....	49	41	42	2975
MB837Aa	A	M-S-P	4	V-8	6.5 x 6.891	530-600	2000-2200	G	....	E	M	....	50	41	44	3085

**Horsepower ratings given are intermittant, industrial and marine, at 29.92 in. HG, 80°F intake air temperature and 60% relative humidity. Where HP range is given, the higher hp is maximum rating for automotive applications.* ****Highly turbocharged.* †*Horizontal engine.* ††*Uses compressed air motor starting.*

DAF of Holland, Inc., P. O. Box 690, Stamford, Conn.

Van Doorne's Automobielfabriek N. V., Eindhoven, Holland

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
DA475	A	M-S-P	4	6	3.96 x 3.94	100	2500	C	....	E	....	**	44	30	30	1000
DD575	A	M-S-P	4	6	3.96 x 4.75	120	2500	C	....	E	....	**	44	30	33	1150
DS575	A	M-S-P	4	6	3.96 x 4.75	165	2400	C	....	E	T	**	44	30	41	1200

**Maximum horsepower* ****As requested*

Henschel-Werke GmbH, Kassel, Germany (Norca Machinery Corp., 350 - 5th Ave., New York, N. Y.)

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
4R1013†	A	M-S-P	4	4	3.94 x 5.12	66–90	2200–2600	G	....	E	....	....	34	25	38	725
4R1013A†	A	M-S-P	4	4	3.94 x 5.12	75–100	2200–2600	G	....	E	M	....	37	26	40	815
6R1013	A	M-S-P	4	6	3.94 x 5.12	96–125	2200–2500	G	....	E	....	....	44	25	42	1040
6U1013**	A	M-S-P	4	6	3.94 x 5.12	96–125	2200–2500	G	....	E	....	....	50	50	18	1080
6R1013A	A	M-S-P	4	6	3.94 x 5.12	110–150	2200–2500	G	....	E	M	....	47	25	43	1140
6U1013A**	A	M-S-P	4	6	3.94 x 5.12	110–150	2000–2500	G	....	E	M	....	50	55	20	1180
6R1115	A	M-S-P	4	6	4.34 x 5.90	114–145	2000–2200	G	....	E	....	....	53	33	44	1330
6U1115**	A	M-S-P	4	6	4.59 x 5.90	124–158	2000–2200	G	....	E	....	....	52	49	21	1450
6R1215D	A	M-S-P	4	6	4.92 x 5.90	143–180	1800–2000	G	....	E	....	....	53	28	43	1590
6R1416	A	M-S-P	4	6	5.31 x 6.1	160–200	1600–1800	G	....	A-E	....	....	59	32	49	2430
6U1416**	A	M-S-P	4	6	5.31 x 6.1	160–200	1600–1800	G	....	E	....	....	69	51	29	2430
6R1416A	A	M-S-P	4	6	5.31 x 6.1	212–285	1600–1800	G	....	A-E	T	....	73	32	49	2520
6U1416A**	A	M-S-P	4	6	5.31 x 6.1	212–285	1600–1800	G	....	E	T	....	76	51	29	2520
8V1416	A	M-S-P	4	8	5.31 x 6.1	213–265	1600–1800	G	....	A-E	....	....	53	42	49	3100
8V1416A	A	M-S-P	4	8	5.31 x 6.1	283–380	1600–1800	G	....	A-E	T	....	67	42	49	3210
12V1416	A	M-S-P	4	12	5.31 x 6.1	320–400	1600–1800	G	....	A-E	....	....	70	42	49	4320
12V1416A	A	M-S-P	4	12	5.31 x 6.1	424–570	1600–1800	G	....	A-E	T	....	84	42	49	4680

* *Continuous-maximum HP.* ** *Underfloor flat engine.* † *This model can be obtained as underfloor flat engine.*

Kloeckner-Humboldt-Deutz—Diesel Energy Corporation 82 Beaver Street, New York 5, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel† System	Ignition	Start	Supercharge	Rev. Gear	Length In.††	Width In.††	Height In.††	Weight Lb.††
MAH711	A	M-S-P	4	1	3 1/16 x 4 1/16	6	1500	O	....	H	....	....	31	24	21	374
MAH914	A	M-S-P	4	1	4 1/2 x 5 1/2	11	1500	O	....	H	....	....	39	30	26	698
MAH916	A	S-P	4	1	4 3/4 x 6 3/4	16	1800	O	....	H-A	....	....	44	35	28	957
MAH320	A	S-P	4	1	6 1/4 x 7 7/8	20	1000	O	....	H-A	....	....	55	39	32	1717
F1-6L712	A**	M-S-P	4	1–4 & 6	3 3/4 x 4 3/4	10–90	2000–2800	O-B	....	H-E	....	....	49	28	34	902
A2-6L514	A**	M-S-P	4	2–4 & 6	4 5/8 x 5 1/2	32–84	1800	B	....	H-E	....	....	64	34	40	1606
A6L614	A**	S-P	4	V-6	4 5/8 x 5 1/2	84	1800	B	....	E	....	....	39	46	35	1672
A8L614	A**	M-S-P	4	V-8	4 5/8 x 5 1/2	112	1800	B	....	E	....	....	47	47	35	1981
A12L614	A**	M-S-P	4	V-12	4 5/8 x 5 1/2	170	1800	B	....	E	....	....	67	48	35	2862
A6L714	A	M-S	4	V-6	4 3/4 x 5 1/2	125***	2000	B	....	A-E	....	....	42	48	40	1739
A8L714	A	M-S	4	V-8	4 3/4 x 5 1/2	168***	2000	B	....	A-E	....	....	48	48	40	2058
A12L714	A	M-S	4	V-12	4 3/4 x 5 1/2	250***	2000	B	....	A-E	....	....	66	48	35	2972
F6L714	A	P	4	V-6	4 3/4 x 5 1/2	145***	2300	B	....	A-E	....	....	42	48	40	1684
F8L714	A	P	4	V-8	4 3/4 x 5 1/2	195***	2300	B	....	A-E	....	....	48	48	40	1992
F12L714	A	P	4	V-12	4 3/4 x 5 1/2	200***	2300	B	....	A-E	....	....	66	48	35	2972
F3M716	A	M-S-P	4	3	5 1/16 x 6 1/16	90–100	1800–2000	B	....	E	....	....	37	30	41	1380
F4M716	A	M-S-P	4	4	5 1/16 x 6 1/16	120–133	1800–2000	B	....	E	....	....	45	30	46	1670
F6M716	A	M-S-P	4	6	5 1/16 x 6 1/16	180–200	1800–2000	B	....	E-A	....	....	60	30	46	2240
BF6M716	A	M-S-P	4	6	5 1/16 x 6 1/16	230	1800	B	....	E-A	T	....	65	32	47	2420
F12M716	A	M-S-P	4	12	5 1/16 x 6 1/16	360–400	1800–2000	B	....	E-A	....	....	70	52	39	3960
BF12M716	A	M-S-P	4	12	5 1/16 x 6 1/16	460	1800	B	....	E-A	T	....	83	52	51	4400
A2-8M517	A	M-S-P	4	2, 4, 6 & 8	5 1/16 x 6 1/16	42–170	1500	B	....	E	....	....	130	30	48	3192
BA8M517	A	M-S-P	4	8	5 1/16 x 6 1/16	250	1500	B	....	E-A	T	....	130	30	51	3501
T8M420	A	M-S-P	2	V-8	6 1/16 x 7 1/16	400	1200	O	....	E	....	....	80	48	61	4730
T12M420	A	M-S-P	2	V-12	6 1/16 x 7 1/16	600	1200	O	....	A	....	....	99	48	63	6495
BT8M420	A	M-S-P	2	8	6 1/16 x 7 1/16	560	1200	O	....	E-A	T	....	78	49	78	5500
BT12M420	A	M-S-P	2	12	6 1/16 x 7 1/16	840	1200	O	....	E-A	T	....	102	49	78	7266
A4-8M428	D	M-S-P	4	4, 6 & 8	8 1/16 x 11	150–310	600	O	....	A	....	D	130	56	65	14467
A3&4M528	D	M-S-P	4	3 & 4	8 1/16 x 11	110–150	600	O	....	A	....	D	82	56	75	8808
A6&8M528	D	M-S-P	4	6 & 8	8 1/16 x 11	290–370	750	O	....	A	....	D	139	52	75	14753
BA6&8M528	D	M-S-P	4	6 & 8	8 1/16 x 11	460–620	750	O	....	A	T	D	155	52	96	15414
V6&8M536	D	M-S-P	4	6 & 8	10 5/16 x 14 5/16	450 & 510	514	O	....	A	....	D	164	43	83	27525
V6&8M545	D	M-S-P	4	6 & 8	13 x 17 3/4	550 & 660	375	O	....	A	....	D	196	53	94	44040
BV6&8M536	D	M-S-P	4	6 & 8	10 5/16 x 14 5/16	750 & 900	514	O	....	A	T	D	170	43	103	28515
BV6&8M545	D	M-S-P	4	6 & 8	13 x 17 3/4	1000 & 1320	380	O	....	A	T	D	201	53	128	43709
BV12M350	D	M-S	4	12	15 3/4 x 19 3/4	3200	375	O	....	A	T	D	250	110	138	118000
V6&8M358	D	M-S-P	4	6 & 8	15 3/4 x 22 1/8	810–1090	300	O	....	A	....	D	248	45	137	86979
BV6&8M358	D	M-S-P	4	6 & 8	15 3/4 x 22 1/8	1600–2160	300–320	O	....	A	T	D	248	79	137	86818
V6&8M366	D	M-S-P	4	6 & 8	16 1/2 x 26	915–1210	275	O	....	A	....	D	300	72	142	118027
BV6&8M366	D	M-S-P	4	6 & 8	16 1/2 x 26	1500 & 2000	275	O	....	A	T	D	276	72	160	119568

* *Continuous HP* † *B Denotes Robert Bosch Equipment.* †† *Where range of engines is shown, weights and dimensions are for largest engine in range. In most cases, width and height are the same for all engines in the range.* ** *Air Cooled.* *** *Engine running at 2000 rpm; HP intermittent. Engine running at 2300 rpm; HP automotive.*

Lister-Blackstone, Inc., 42-32 21st Street, Long Island City 1, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
LD1	A	M-S	4	1	3 x 3 1/2	3.5	1800	C	....	H-E	....	O	22	19	25	245
LD2	A	M-S	4	2	3 x 3 1/2	7	1800	C	....	H-E	....	O	28	21	28	406
SL1	A	M-S	4	1	3 1/16 x 3 1/2	4 1/4	1800	C	....	H-E	....	O	22	20	25	245
SL2	A	M-S	4	2	3 1/16 x 3 1/2	8 1/2	1800	C	....	H-E	....	O	28	20	28	406
SL3	A	M-S	4	3	3 1/16 x 3 1/2	12 3/4	1800	C	....	H-E	....	O	33	20	28	470
HA2	A	M-S	4	2	4 x 4 1/2	22	1800	C	....	H-E	....	O	38	26	36	620
HA3	A	M-S	4	3	4 x 4 1/2	33	1800	C	....	H-E	....	O	43	26	36	830
HB2	A	M-S	4	2	4 x 4 1/2	24	2000	C	....	H-E	....	O	38	26	36	604
HB3	A	M-S	4	3	4 x 4 1/2	36	2000	C	....	H-E	....	O	43	26	36	848
3 1/2/1	A	S-P	4	1	3 3/4 x 5 1/2	3.5	650	C	....	H	....	....	36	24	47	737
6/1	A	S-P	4	1	4 1/2 x 5 1/2	6	650	C	....	H	....	....	36	24	47	692
8/1	A	S-P	4	1	4 1/2 x 5 1/2	8	850	C	....	H	....	....	36	24	47	778
VA	A	S-P	4	1	4 1/2 x 5 1/2	7.5	850	C	....	H	....	....	35 1/2	25 1/2	39 1/2	756
12–2	A	S-P	4	2	4 1/2 x 5 1/2	12	650	C	....	H	....	....	51	24	44	1040
16/2	A	S-P	4	2	4 1/2 x 5 1/2	16	850	C	....	H	....	....	51	24	47	1100
JP2	A	M-S	4	2	4 1/2 x 5 1/2	23	1200	C	....	H-E	....	O	55	29	42	2084
JP3	A	M-S	4	3	4 1/2 x 5 1/2	35	1200	C	....	H-E	....	O	64	29	42	2496
JP4	A	M-S	4	4	4 1/2 x 5 1/2	46	1200	C	....	E	....	O	88	38	42	3024
JP616	A	M-S	4	6	4 1/2 x 5 1/2	70	1200	C	....	E	....	O	93	34	44	3752
FR1	A	M-S	4	1	3 3/4 x 4 1/2	9	1800	C	....	H-E	....	O	25	23	36	795
FR2	A	M-S	4	2	3 3/4 x 4 1/2	18	1800	C	....	H-E	....	O	30	23	36	977
FR3	A	M-S	4	3	3 3/4 x 4 1/2	27	1800	C	....	H-E	....	O	35	23	36	1164
FR4	A	M-S	4	4	3 3/4 x 4 1/2	36	1800	C	....	E	....	O	44	23	36	1370
FR6	A	M-S	4	6	3 3/4 x 4 1/2	54	1800	C	....	E	....	O	54	23	36	1660
TS3	A	M-S	2	3	3 1/4 x 4†	80	1800	C	....	E	....	C	65	31	29	1330

* *BHP quoted is for 12 hour continuous running with 10% overload for 1 hour.* † *TS3 is a horizontal opposed-piston engine. Multiply stroke per cylinder by 2 to obtain total piston travel.*

Mak Maschinenbau Kiel GmbH., Kiel-Friedrichsort, Germany

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.†	Height In.	Weight Lb.†
MV24	A	M-S	4	4	7 1/32 x 9 29/64	80–160	500–1000	G	....	A-E	....	**	67	33	56	5730
MS24	A	M-S-P	4	6	7 1/32 x 9 29/64	120–240	500–1000	G	....	A-E	....	**	88	33	56	7600
MS301F	A	M-S-P	4	6	9 1/16 x 11 13/16	300–450	600–900	G	....	A-E	....	**	122	35	77	12570
MS301FA	A	M-S-P	4	6	9 1/16 x 11 13/16	520–750	600–900	G	....	A-E	T	**	144	35	77	13160
MS301FAK	A	M-S-P	4	6	9 1/16 x 11 13/16	570–900	600–900	G	....	A-E	T	**	150	35	77	13270
MA301F	A	M-S-P	4	8	9 1/16 x 11 13/16	400–600	600–900	G	....	A-E	....	**	147	35	77	16320
MA301FA	A	M-S-P	4	8	9 1/16 x 11 13/16	700–1000	600–900	G	....	A-E	T	**	181	35	77	17590
MA301FAK	A	M-S-P	4	8	9 1/16 x 11 13/16	735–1200	600–900	G	....	A-E	T	**	181	35	77	17770
MD36	A	M-S	4	3	8 15/32 x 14 3/16	90–120	375–500	G	....	A	....	**	83	43	79	7720
MV361	A	M-S	4	4	8 15/32 x 14 3/16	130–205	375–600	G	....	A	....	**	97	43	79	9700
MS361	A	M-S	4	6	8 15/32 x 14 3/16	190–310	375–600	G	....	A	....	**	124	43	79	14220
MS361A	A	M-S	4	6	8 15/32 x 14 3/16	300–450	375–600	G	....	A	T	**	133	43	80	14550
MS361AK	A	M-S	4	6	8 15/32 x 14 3/16	325–500	375–600	G	....	A	T	**	133	43	80	14990
MV423	A	M-S	4	4	11 27/64 x 16 33/64	180–260	260–375	G	....	A	....	D	109	48	91	18080
MS423/424	A	M-S	4	6	11 27/64 x 16 33/64	275–450	260–428	G	....	A	....	D	144	48	91	26460
MS423/424A	A	M-S	4	6	11 27/64 x 16 33/64	400–650	260–428	G	....	A	T	D	158	48	94	27560
MS423/424AK	A	M-S	4	6	11 27/64 x 16 33/64	420–750	260–428	G	....	A	T	D	171	48	94	28000
MA423/424	A	M-S	4	8	11 27/64 x 16 33/64	360–600	260–428	G	....	A	....	D	180	48	91	33730
MA423/424A	A	M-S	4	8	11 27/64 x 16 33/64	520–860	260–428	G	....	A	T	D	207	48	96	36380
MA423/424AK	A	M-S	4	8	11 27/64 x 16 33/64	560–1000	260–428	G	....	A	T	D	209	48	96	36820
4Z421	A	M-S	2	4	11 27/64 x 16 33/64	375–500	280–375	G	....	A	....	D	129	48	108	27560
4Z421AK	A	M-S	2	4	11 27/64 x 16 33/64	525–700	280–375	G	....	A	T	D	110	63	116	27560
6Z421	A	M-S	2	6	11 27/64 x 16 33/64	560–750	280–375	G	....	A	....	D	173	48	108	34400
6Z421AK	A	M-S	2	6	11 27/64 x 16 33/64	785–1050	280–375	G	....	A	T	D	158	63	116	34400
8Z421	A	M-S	2	8	11 27/64 x 16 33/64	750–1000	280–375	G	....	A	....	D	208	48	108	41230
8Z421AK	A	M-S	2	8	11 27/64 x 16 33/64	1050–1400	280–375	G	....	A	T	D	181	63	116	41230
MS582	A	M-S	4	6	16 5/32 x 22 27/32	625–750	250–300	G	....	A	....	D	212	56	136	71430
MS582AK	A	M-S	4	6	16 5/32 x 22 27/32	1050–1250	250–300	G	....	A	T	D	232	56	136	74070
MA582	A	M-S	4	8	16 5/32 x 22 27/32	835–1000	250–300	G	....	A	....	D	264	56	136	87300
MA582AK	A	M-S	4	8	16 5/32 x 22 27/32	1380–1650	250–300	G	....	A	T	D	289	56	136	94140
MN582AK	A	M-S	4	9	16 5/32 x 22 27/32	1500–1800	250–300	G	....	A	T	D	316	56	136	106700
MZ582AK	A	M-S	4	10	16 5/32 x 22 27/32	1670–2000	250–300	G	....	A	T	D	341	56	136	117720

*Continuous **Reverse gear of German make †Length and weight without flywheel

Maschinenfabrik-Augsburg-Nuernberg A. C., American M•A•N Corp., 500-Fifth Ave., New York 36, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
D0022M	A†	M-S-P	4	2	3.94 x 4.92	12.5–22	1000–1800	G	....	A-E	....	....	24	29	37	770
D0024M	A†	M-S-P	4	4	3.94 x 4.92	27–45	1000–1800	G	....	A-E	....	....	35	32	37	1030
D0026M	A†	M-S-P	4	6	3.94 x 4.92	42–68	1000–1800	G	....	A-E	....	....	44	27	43	1130
D1246M	A†	M-S-P	4	6	4.41 x 5.51	60–90	1000–1800	G	....	A-E	....	....	47	28	45	1520
D1548M	A†	M-S-P	4	8	4.53 x 5.51	80–140	1000–1800	G	....	A-E	....	....	45	47	49	2000
D1548MT	A†	M-S-P	4	8	4.53 x 5.51	95–165	1000–1800	G	....	A-E	T	....	45	56	53	2400
WV14/18	D	M-S-P	4	4 & 6	5.51 x 7.08	55–180	750–1500	G	....	A-E	....	....	45&62	25	46	.....
WV14/18mA	A	M-S-P	4	6	5.51 x 7.08	165–275	1000–1500	G	....	A-E	T	....	73	25	50	4300
RV16/18	A	M-S-P	4	6 & 8	6.30 x 7.09	160–320	1000–1600	G	....	A-E	....	....	...	...	...	.....
RV16/18mA	A	M-S-P	4	6 & 8	6.30 x 7.09	230–500	1000–1600	G	....	A-E	T	....	...	...	...	.....
V6V16/18	A	M-S-P	4	12	6.30 x 7.09	320–480	1000–1600	G	....	A-E	....	....	...	...	...	.....
V6V16/18mA	A	M-S-P	4	12	6.30 x 7.09	460–750	1000–1600	G	....	A-E	T	....	...	...	...	.....
WV17.5/22A	D	M-S-P	4	3–6, 8	6.89 x 8.66	64–280	600–1000	G	....	A-E	....	....	44-98	32	53-57	.....
WV17.5/22AmA	A	M-S-P	4	6 & 8	6.89 x 8.66	220–415	720–1000	G	....	A-E	T	....	93&115	32	55&63	.....
WV22/30A	A	M-S-P	4	6 & 8	8.66 x 11.81	250–520	600–900	G	....	A-E	....	....	98&122	30	74	.....
WV22/30AmA	A	M-S-P	4	6 & 8	8.66 x 11.81	395–950	600–900	G	....	A-E	T	....	98&122	30	75&78	.....
VV22/30	A	M-S-P	4	12 & 16	8.66 x 11.81	500–1040	600–900	G	....	A-E	....	....	...	...	...	.....
VV22/30mA	A	M-S-P	4	12 & 16	8.66 x 11.81	790–1900	600–900	G	....	A-E	T	....	...	...	...	.....
WV30/38	A	M-S	4	6,8,10&12	11.81 x 14.96	500–1440	500–700	O	....	A	....	D	...	...	...	.....
WV30/38AmA	A	M-S	4	6,8,10&12	11.81 x 14.96	800–2300	500–700	O	....	A-E	T	D	...	...	...	.....
L12V18/21	A	M-S-P	4	12	7.1 x 8.27	390–700	1000–1500	G	....	A-E	....	....	81	54	70	8000
L12C18/21mA	A	M-S-P	4	12	7.1 x 8.27	570–1250	1000–1500	G	....	A-E	T	....	86	54	81	8600
GV23.5/33	D	M-S	4	3–8	9.25 x 12.99	105–440	360–600	O	....	A	....	D	...	...	...	.....
GV23.5/33mA	D	M-S	4	6–8	9.25 x 12.99	310–685	360–600	O	....	A	T	D	...	...	...	.....
GV30/45	D	M-S	4	3–9	11.81 x 17.71	160–790	250–428	O	....	A	....	D	...	...	...	.....
GV30/45mA	D	M-S	4	6–9	11.81 x 17.71	475–1170	250–428	O	....	A	T	D	...	...	...	.....
VV30/45	A	M-S-P	4	12–18	11.81 x 17.71	700–1680	250–428	O	....	A	....	....	...	...	...	.....
VV30/45mA	A	M-S-P	4	12–18	11.81 x 17.71	950–2670	250–428	O	....	A	T	....	...	...	...	.....
GV40/60	D	M-S	4	6–10	15.75 x 23.62	640–1430	225–300	O	....	A	....	D	...	...	...	.....
GV40/60mA	D	M-S	4	6–10	15.75 x 23.62	1020–2280	225–300	O	....	A	T	D	...	...	...	.....
GV52/74A	D	M-S	4	6–10	20.47 x 29.13	1110–2500	188–250	O	....	A	....	D	...	...	...	.....
GV52/74AmA	D	M-S	4	6–10	20.47 x 29.13	1770–4000	188–250	O	....	A	T	D	...	...	...	.....
KV45/66mHA	A††	M-S	4	6–8	17.71 x 25.98	1800–3730	214–250	O	....	A	T***	D	...	...	...	.....
GZ52/70	A	M-S	2	5–10	20.47 x 27.56	1620–4250	187–250	O	....	A	....	D	...	...	...	.....
GZ52/90	A	M-S	2	5–10	20.47 x 35.43	1385–4100	125–187	O	....	A	....	D	...	...	...	.....
KZ57/80	A††	M-S	2	5–10	22.44 x 31.50	2200–6360	187–225	O	....	A	....	D	...	...	...	.....
KZ57/80C	A††	M-S	2	6–10	22.44 x 31.50	3300–8000	187–225	O	....	A	T	D	...	...	...	.....
KZ60/105	A††	M-S	2	5–10,12	23.62 x 41.34	2160–6800	125–167	O	....	A	....	D	...	...	...	.....
KZ60/105C	A††	M-S	2	6–10,12	23.62 x 41.34	3240–8840	125–167	O	....	A	T	D	...	...	...	.....
KZ70/120	A††	M-S	2	4–10	27.56 x 47.24	2350–7000	110–130	O	....	A	....	D	...	...	...	.....
KZ70/120C	A††	M-S	2	6–10	27.56 x 47.24	4590–9050	110–130	O	....	A	T	D	...	...	...	.....
KZ78/140	A††	M-S	2	6–10	30.70 x 55.10	4440–9200	95–118	O	....	A	....	D	...	...	...	.....
KZ78/140C	A††	M-S	2	6–10	30.70 x 55.10	5760–12000	95–118	O	....	A	T	D	...	...	...	.....
KZ78/155	A††	M-S	2	8–10, 12	30.70 x 61.02	6600–12000	95–115	O	....	A	....	D	...	...	...	.....
KZ78/155C	A††	M-S	2	8–10, 12	30.70 x 61.02	8650–15600	95–115	O	....	A	T	D	...	...	...	.....
KZ84/160C	A††	M-S	2	8–10, 12	33.07 x 62.99	10500–20000	95–115	O	....	A	T	D	...	...	...	.....
DZ53/80	A**	M-S	2	4–10	20.87 x 31.50	2855–8100	188–214	O	....	A	....	D	...	...	...	.....
DZ60/110	A**	M-S	2	5–10	23.62 x 43.31	3510–8550	105–130	O	....	A	....	D	...	...	...	.....
DZ72/120	A**	M-S	2	5–10	28.34 x 47.24	5000–12450	95–120	O	....	A	....	D	...	...	...	.....

* Continuous HP. *** Highly Turbocharged. ** Double acting. † "Whisper" Engine, multi-fuel use (With MAN Patented Silent Combustion Principle)
†† Cross head.

Napier Engines Inc., Subsidiary of D. Napier & Son, Ltd., 909 Dupont Circle Bldg., Washington 6, D.C.

Model††	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.††	HP.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
9-26B&C	A	M-S-P	2	9	5 1/4 x 7 1/4	860	1500	..	....	A	....	O	76	44	90	6900
9-26K	A	M	2	9	5 1/4 x 7 1/4	825	1500	..	....	A	....	O	101	44	90	9300
T9-29	A	S-P	2	9	5 1/4 x 7 1/4	1150	1600	..	....	A	T	....	86	44	90	7500
18-25C	A	S-P	2	18	5 1/4 x 7 1/4	1725	1500	..	....	A	....	....	101	44	90	10500
18-25K&39K	A	M	2	18	5 1/4 x 7 1/4	1650–1875	1500–1700	..	....	A	....	O	127	44	90	13300
T18-27C	A	S-P	2	18	5 1/4 x 7 1/4	2300	1600	..	....	A	T	....	122	44	90	10800
T18-27K&37K	A	M	2	18	5 1/4 x 7 1/4	2100–2400	1600–1800	..	....	A	T	O	153	44	90	13700

* Continuous HP † All models are of the "Deltic" 2-cycle opposed piston design. †† Multiply stroke by 2 because of opposed piston design.

F. Perkins (Canada) Limited, 60 Wingold Avenue, Toronto 19, Ontario Canada

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
FOUR 99	A	M-S-P	4	4	3 x 3½	34.8–47.5	3–4000	C	....	E	....	P-V†	22	20	25	341
P3/144	A	M-S-P	4	3	3½ x 5	32.7–41	2–2400	C	....	E-H	....	P†	23	23	30	448
FOUR 192	A	S-P	4	4	3½ x 5	43.6–62	2–3000	C	....	E	....	....	26	24	30	526
FOUR 208	A	S-P	4	4	3.6 x 5	47.5–65	2–3000	C	....	E	....	....	26	24	30	526
P6	A	M-S-P	4	6	3½ x 5	65.4–88	2–3000	C	....	E	....	SC***	34	24	33	734
SIX 305	A	M-S-P	4	6	3.6 x 5	71–89	2–2600	C	....	E	....	SC***	34	24	33	740
FOUR 270	A	M-S-P	4	4	4¼ x 4¾	56.5–62	2000	C	....	E	....	SC***	32	22	31	680
SIX 340	A	P	4	6	4 x 4½	112	2850	C	....	E	....	....	39	24	35	906
S6	A	M-S	4	6	4¾ x 5	104.9	2000	C	....	E	....	SC***	39	30	35	1100

†Parsons. V—Warner Velvet Drive ***Self Changing Gears

*Where a horsepower and rpm range is shown the low end is the continuous industrial rating to BS 649:1958 (85°F and 29.5-in. Hg) and the high end the maximum gross car, vehicle or tractor rating.

Hawker Siddeley Brush, Inc., 34-14 58th St., Woodside 77, L. I., N. Y.

Petters, Ltd.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	HP.	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev.†† Gear	Length In.	Width In.	Height In.	Weight Lb.
PAZ1	A	S-P	4	1	3 x 3	1.875–3.75*	1000/1800	BR†	....	H	....	....	29	20	29	273
AVA1	A	S-P	4	1	3.15 x 4.33	3.75–7.5*	1000/1800	BR†	....	H-E	....	....	30	23	33	412
AVA2	A	S-P	4	2	3.15 x 4.33	7.5–15.0*	1000/1800	BR†	....	H-E	....	....	37	23	34	558
PH1	A	S-P	4	1	4.4375 x 4.33	4.8–9.75*	1000/2000	BR†	....	H-E	....	....	30	23	33	415
PH2	A	S-P	4	2	4.4375 x 4.33	9.6–19.5*	1000/2000	BR†	....	H-E	....	....	37	23	34	563
PC1	A	S-P	4	1	3 x 3	4.5–6.25*	2000/3000	BR†	....	H-E	....	....	28	17	28	243
PC2	A	S-P	4	2	3 x 3	8.1–12.5*	2000/3000	BR†	....	H-E	....	....	25	23	31	329
PC3	A	S-P	4	3	3 x 3	12.2–18.75*	2000/3000	BR†	....	E	....	....	24	23	31	439
PC4	A	S-P	4	4	3 x 3	16.25–25*	2000/3000	BR†	....	E	....	....	28	23	31	503
AV1	A	S-P	4	1	3.15 x 4.33	3.75–7.5*	1000/1800	BR†	....	H-E	....	....	30	21	33	390
AV2	A	S-P	4	2	3.15 x 4.33	7.5–15*	1000/1800	BR†	....	H-E	....	....	37	21	34	545
PHW1	A	S-P	4	1	4.4375 x 4.33	4.8–9.75*	1000/2000	BR†	....	H-E	....	....	30	21	33	393
PHW2	A	S-P	4	2	4.4375 x 4.33	9.6–19.5*	1000/2000	BR†	....	H-E	....	....	37	21	34	551
PD2	A	M-S-P	4	2	4.5 x 4.33	11–24**	1200/1800	BR†	....	H-E	....	PAR	34	28	36	1020
PD3	A	M-S-P	4	3	4.5 x 4.33	24–36**	1200/1800	BR†	....	H-E	....	PAR	40	28	36	1160
PD4	A	M-S-P	4	4	4.5 x 4.33	36–52**	1200/1800	BR†	....	H-E	....	PAR	46	28	39	1330
PDV6	A	M-S-P	4	6	4.5 x 4.33	54–78**	1200/1800	BR†	....	E	....	PAR	41	49	34	1680
PDV8	A	M-S-P	4	8	4.5 x 4.33	72–104**	1200/1800	BR†	....	E	....	S.C.	49	49	34	1990
B2	A	M-S-P	4	2	4.33 x 4.33	13–20**	1000/1500	BR†	....	H-E	....	PAR	47	23	40	987
B3	A	M-S-P	4	3	4.33 x 4.33	20–36**	1000/1800	BR†	....	H-E	....	PAR	55	23	40	1211
B4	A	M-S-P	4	4	4.33 x 4.33	26–48**	1000/1800	BR†	....	H-E	....	PAR	62	23	43	1478
AVA1M	A	M	4	1	3.15 x 4.33	5–6**	1500/1800	BR†	....	H-E	....	BMC	37	22	27	575
AVA2M	A	M	4	2	3.15 x 4.33	10–12**	1500/1800	BR†	....	H-E	....	BMC	44	22	27	721
PH1M	A	M	4	1	4.4375 x 4.33	6.25–7.5**	1500/1800	BR†	....	H-E	....	BMC	37	22	27	579
PH2M	A	M	4	2	4.4375 x 4.33	12.5–15**	1500/1800	BR†	....	H-E	....	BMC	44	22	27	725
PC2M	A	M	4	2	3 x 3	10**	3000	BR†	....	H	....	BMC	40	23	33	522
PC3M	A	M	4	3	3 x 3	15**	3000	BR†	....	E	....	BMC	45	23	33	655
PC4M	A	M	4	4	3 x 3	20**	3000	BR†	....	E	....	BMC	49	23	33	719
AV1M	A	M	4	1	3.15 x 4.33	5–6**	1500/1800	BR†	....	H-E	....	BMC	37	22	27	580
AV2M	A	M	4	2	3.15 x 4.33	10–12**	1500/1800	BR†	....	H-E	....	BMC	44	22	27	761
PHW1M	A	M	4	1	4.4375 x 4.33	6.25–7.5**	1500/1800	BR†	....	H-E	....	BMC	37	22	27	580
PHW2M	A	M	4	2	4.4375 x 4.33	12.5–15**	1500/1800	BR†	....	H-E	....	BMC	44	22	27	761
ASM1	A	S-P	4	1	4.25 x 4.25	6–11**	1000/1800	C	....	H-E	....	....	28	25	34	510
ASM2	A	S-P	4	2	4.25 x 4.25	14–22**	1000/1800	C	....	H-E	....	....	35	24	37	700
ASM3	A	S-P	4	3	4.25 x 4.25	20–33**	1000/1800	C	....	H-E	....	....	43	27	39	970
23CVM	A	M	4	4	3.3125 x 4	45**	3000	C	....	E	....	OPT.	51	24	30	830

* Maximum or rated. ** Continuous. † Bryce. †† PAR-Parsons. BMC-British Motor Corp. S.C. Self-changing gears. OPT—optional

Mirrlees, Bickerton & Day, Ltd., Hazel Grove, Stockport, England

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
TL**	A	M-S-P	4	3–6	8½ x 13¾	135/432	500/650	BR†	....	A-E	T	OPT.	...	...	...	.....
J	A	M-S-P	4	3–16	9¾ x 10½	141/2272	500/900	BR†	....	A-E	T	OPT.	...	...	...	.....
JL	A	M-S-P	4	3–8	9¾ x 12½	168/1048	500/750	BR†	....	A-E	T	OPT.	...	...	...	.....
K	C	M-S	4	3–16	15 x 18	291/4440	300/450	BR†	....	A	T	OPT.	...	...	...	.....
AL	A	M	4	6–10	19 x 27	1600/4340	200/300	BR†	....	A	T	OPT.	...	...	...	.....

* Continuous † Bryce ** 6-cyl model has 13-in. Stroke Opt = Optional Notes on National & Mirrlees Engines—ratings given at N.P.T. for operation on diesel fuel. Models NM, R4A, F4A, J, JL, K, AL available naturally-aspirated or turbocharged with or without aftercoolers. Models LE & TL available naturally-aspirated or turbocharged, no after coolers.

National Gas & Oil Engine Co., Ltd., Ashton-Under-Lyne, England

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Supercharge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
NM	A	M-S-P	4	6/6	6 x 8½	164/533	1000/1500	BR†	....	A-E	T	OPT.	...	...	...	.....
R4A	D	M-S-P	4	3–8	9 x 12	165/864	600/750	BR†	....	A	T	OPT.	...	...	...	.....
F4A	D	M-S	4	3–8	12 x 15	285/1372	500/600	BR†	....	A	T	OPT.	...	...	...	.....
LE	A	M-S-P	4	4/6	5½ x 6	80/240	1200/1800	BR†	....	A-E-HY	T	OPT.	...	...	...	.....

* Continuous † Bryce OPT—Optional

Sulzer Bros., Ltd., New York, 50 Church Street, New York 7, N. Y.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
TA24	..	M	2	6 & 8	9.45 x 15.75	630/840	400	O	....	A	T	O-D	180/211	59/62	72	46200/58500
TA36	..	M-S	2	4-10 & 12	14.16 x 23.7	880/2640	250	O	....	A	T	D	189/404	82/90	125/137	78300/168000
TA48	..	M-S	2	5-10 & 12	18.9 x 27.6	1875/4500	225	O	....	A	T	D	233/468	126	120	151000/318000
TAD56	..	M	2	5-8,10 & 12	22 x 39.4	2500/6000	155	O	....	A	T	D	274/547	140	156	256000/512000
SAD60	..	M	2	6-12	23.6 x 41	3200/7680	150	O	....	A	T	D	274/590	141	222	338000/725000
RD68	..	M	2	6-12	26.8 x 49.2	5500/13200	135	O	....	A	T	D	329/715	216	250	458000/1000000
RD76	..	M	2	5-12	29.9 x 61	7500/18000	119	O	....	A	T	D	368/788	191	308	697000/1515000
RD90	..	M	2	6-12	35.4 x 61	12000/24000	119	O	....	A	T	D	469/923	196	318	1098000/2064000
BA22	..	S	4	5, 6 & 8	8.65 x 12.6	350/600	600	O	....	A	T	..	....	....	....	20700/28800
BCA29	..	S	4	6 & 8	11.4 x 14.2	900/1200	500	O	....	A	T	..	....	....	....	42800/158200
LDA22	..	P	4	6	8.65 x 11.4	725	950	O	....	E	T	..	....	....	....	11500
LDA25	..	P	4	6 & 8	9.8 x 12.6	935/1250	850	O	....	E	T	..	....	....	....	16100/20700
LDA28	..	P	4	6, 8 & 12	11 x 14.2	1160/2300	750	O	....	E	T	..	....	....	....	21000/43400

Continuous Horsepower

Volvo Diesels, Volvo Import Inc., 452 Hudson Terrace, Englewood Cliffs, N. J.

Model	Type	Use	Cycle	No. Cyl.	Bore & Stroke In.	Hp.*	R.P.M.	Fuel System	Ignition	Start	Super-Charge	Rev. Gear	Length In.	Width In.	Height In.	Weight Lb.
Penta D1	A	M-S-P	4	1	3 1/2 x 3 15/64	5	2000	G	....	E-H	....	O	19	16	26	260
Bolinder 1051	A	M-S-P	4	1	4 1/2 x 5 1/2	11.8	1500	G	....	E-H	....	O	32	23	38	940
Bolinder 1052	A	M-S-P	4	2	4 1/2 x 5 1/2	26	1800	G	....	E-H	....	O	38	24	38	1110
Bolinder 1113	A	M-S-P	4	3	4 1/2 x 5 1/2	50	2000	G	....	E-H-A	....	O-C-P-S	36	25	39	1190
Bolinder 1114	A	M-S-P	4	4	4 1/2 x 5 1/2	65	2000	C-G	....	E-H-A	....	O-C-P-S	43	24	46	1360
Penta D47	A	M-S-P	4	6	3 3/4 x 4 31/64	71	2000	G	....	E-A	....	D-O-C-B	45	24	38	1210
Penta D67	A	M-S-P	4	6	4 1/4 x 5 1/2	87	1800	C	....	E-A	....	D-O-C-P-T	49	26	42	1380
Penta D96	A	M-S-P	4	6	4 3/4 x 5 1/2	127	1800	G	....	E-A	....	D-C-S-T	55	30	48	1800
Penta TD96	A	S-P	4	6	4 3/4 x 5 1/2	160	1800	G	....	E-A	T	D-C-S-T	55	31	52	1875
Penta TIMD96	A	M	4	6	4 3/4 x 5 1/2	185	1800	G	....	E-A	T†	D-C-S-T	55	31	43	2205

* *Continuous. B.S. Rating.* † *With intercooler.* *Reverse Gear—B—Borg Warner*

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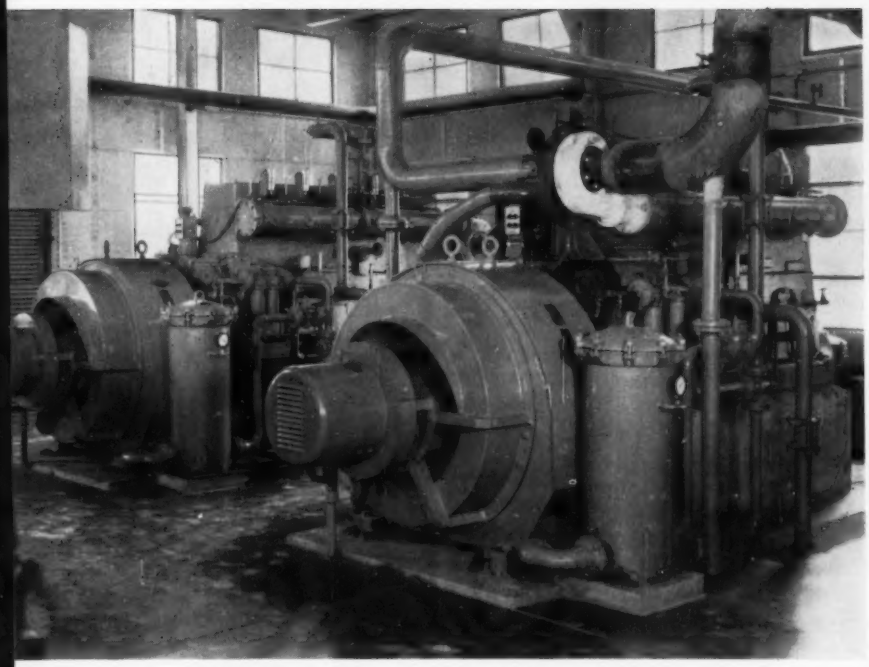

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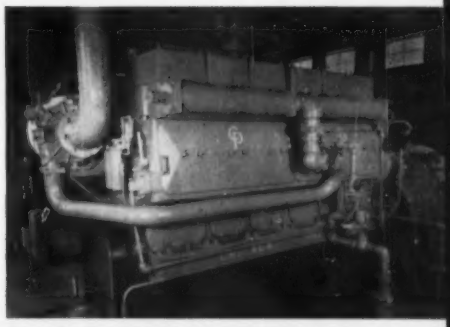

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Chicago Pneumatic *8 East 44th Street, New York 17, N. Y.*

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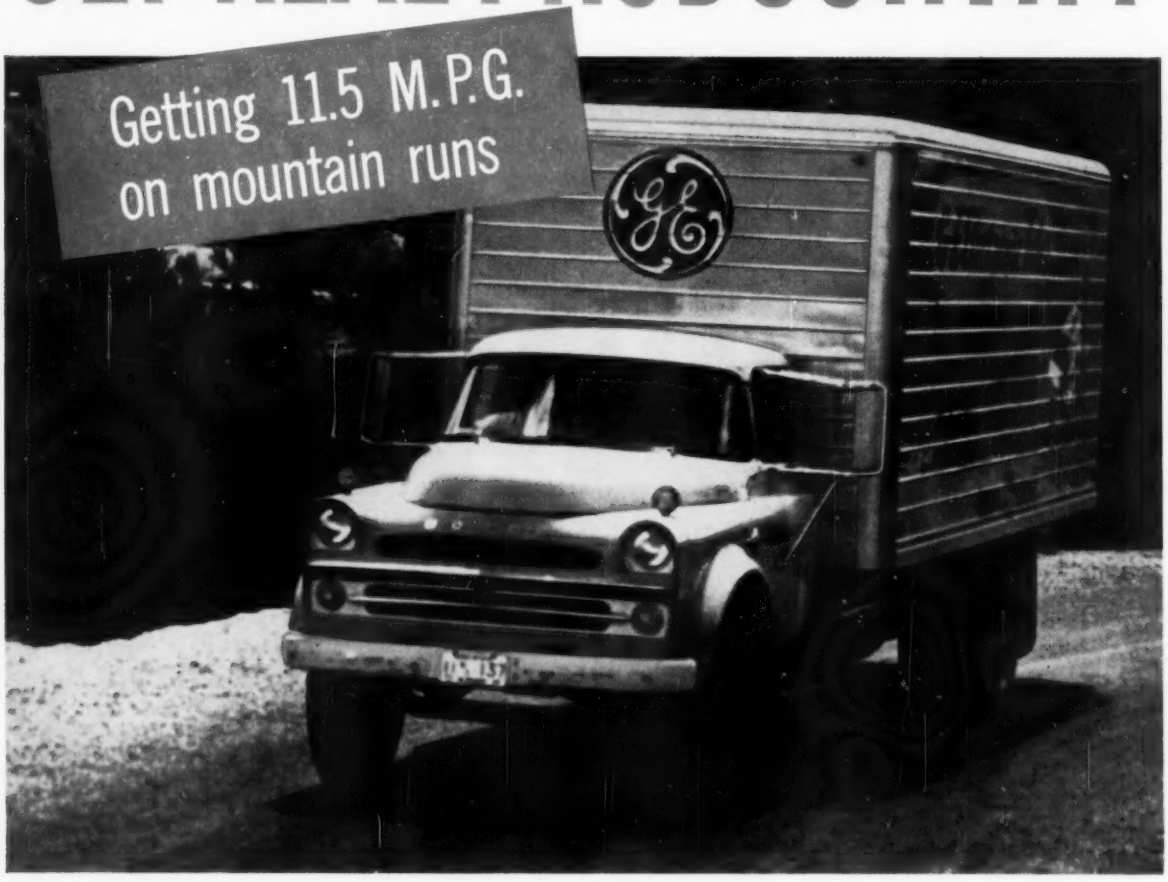

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GE uses the leased truck to haul electronic tubes and supplies over the rugged, mountainous terrain between Anniston, Alabama, and Owensboro, Kentucky. Pay loads average 10,000 lbs.—fuel mileage runs 11.5 m.p.g.

But the big pay-off is in trip time. The truck cruises up hills it crawled up before—cuts hours from the run. And with the rugged GM Diesel engine pulling the grades, big engine repair bills are a thing of the past.

What's more, driving's easier too. With the extra power from the GM Diesel engine, the driver makes his trips with a minimum of gearshifting.

If your gasoline-powered trucks are rated from 15,000 GVW to 40,000 GCW, you can cut your costs 30% to 50% or more by repowering them with a Series 53 GM Diesel engine.

For the full story see your GM Diesel distributor. He's in the Yellow Pages under "Engines, Diesel."

GM DIESEL ALL-PURPOSE

GET A GM DIESEL ENGINE

Ask Eldon "Ted" Silvers of Denver, Colorado, about the 8V-71 GM Diesel engine in his White Freightliner and here's what he'll tell you:

"The GM Diesel engine is smoother and maintains steadier speed under varying conditions of wind, grade and load. I've cut 5 hours off my round-trip time and figure my total savings at $55.00 per trip since I replaced my old Diesel engine."

On the Denver-Chicago run, he hauls 68,000 to 70,000 lbs. GCW—gets up to 6.5 m.p.g. from the GM Diesel engine on No. 2 Diesel fuel.

With over 22 years in the trucking business, Silvers has operated many different makes of trucks and engines. Since replacing another Diesel with the GM "8V-71," he feels he now has "the ideal combination in this truck."

"Ted" Silvers has upped his truck's productivity and his profits by putting a GM Diesel engine in his Freightliner. You can boost your profit, too, by taking his cue.

Write for more information on GM Diesel engines or see your GM Diesel distributor—he's in the Yellow Pages under "Engines, Diesel."

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A Study In Piston Design

story by C. E. Richardson

Traces development of Gillett & Eaton's cast iron piston from initial material selection to casting configuration . . . from cooling considerations to final clearance problems.

C. E. RICHARDSON is vice president of operations for Gillett & Eaton, Lake City, Minnesota. He's a graduate of University of Nebraska . . . member of SAE and ASTE.

How do you go about developing a piston—the heart of the modern diesel engine? Well, tracing that development is our story. . . . Late one evening several years ago a group of maintenance people of a major railroad got together to discuss an engine problem. They didn't know it then, but actually that evening witnessed the birth of a brand new high-alloy piston for railroad use—the G-583 cast iron piston.

After the meeting in which Gustin-Bacon Manufacturing Company was represented, Gillett & Eaton was asked to work out a tentative piston design—a design that would hold up under a wide range of operating conditions in railroad service. Gustin-Bacon Manufacturing Company, destined to eventually distribute this new piston, was assisting in the development.

The Material . . .

First of all the materials going into the new piston had to be decided upon. For many years G&E has specialized in high-strength alloy iron, so we selected this type for our new piston. This alloy guarantees a minimum tensile strength of 53,000 psi. (And it's not uncommon for test bars to check out at 60,000 psi. Brinell hardness is in the range of 230 to 290.)

The Casting Design . . .

Next question considered during preliminary design work was the general casting design. Here at G&E we've had experience making pistons of almost every shape imaginable, both external and internal. So, we weighed the particular advantages as well as disadvantages of

using an intricately ribbed design . . . or using a simple design.

Rib Design Examined . . .

Pistons having many radial ribs extending from the center of the undercrown to the piston sidewall certainly have cooling advantages. But, they also present certain design problems. Sometimes, for instance, in order to create an oil passage near the outer wall a series of cored holes through these ribs are used. Picture all of this, if you will, above the baffle plate which forms an oil chamber. To manufacture a piston of this design it's generally necessary to invest in several coreboxes. Matter of fact, it may require a rather complicated core assembly and it definitely creates a costly cleaning problem.

Let's elaborate on the cleaning problem a bit. Generally you'll find fins on complicated core assembly jobs. These fins must be removed or they break off in service and wash into a critical area with the cooling discharge. Also, all of the spent core sand must be completely removed for the same reason. This is not an easy task when one considers the relatively small opening in baffle through which the cleaning has to be done. All of the foreign material must come out. This is time-consuming and consequently costly.

Generally—in order to cut down on weight—the radial type ribs on the undercrown are relatively thin with rather small fillets at their adjoining corners. Joining a thin rib to a heavier wall is contrary to good foundry practice. These adjoining areas will set up severe internal stresses and are apt to be subject to porosity. And, all of this is going on in an area already subject to high pressure.

Simple Design Picked . . .

By this time you can see why the simpler design won out. Advantages of the simple design, in our opinion, far outnumbered those of its more complicated cousin. Let's take a close-up look at our simple design.

G&E's piston is clean internally with a minimum of parting lines, ribs, etc. With a firing pressure of 1350 psi, the piston must transmit approximately 86,000 lb to the pin and connecting rod. We incorporated three main continuous ribs from the pin bosses to the piston undercrown to carry this tremendous load.

Then we added two reinforcing ribs across the undercrown which also provided additional cooling area. Ribs are blended into sidewalls and undercrown so as to produce a minimum of internal stress. Each piston is pressure-tested to 80 psi of water to insure against porosity. Its baffle plate opening is elongated to provide easier cleaning of the upper cooling chamber.

Simplicity of design eliminated coring fins—but it is still necessary for this area to be completely freed of core sand. Baffle closure, consisting of a flat steel plate and gasket, are bolted and safety-wired in place. At G&E we prefer using a gasket to seal off the relatively rough-cast bottom surface rather than go to the expense of machining it.

Cooling—Critical Design Problem . . .

Oil-cooling system for the new cast iron G-583 is basically the same as that for an aluminum piston: oil is pumped through the connecting rod, wrist pin, and upper chamber. However, the cast iron piston has a larger cooling area exposed to the oil. This is because the cocktail-shaker design is used rather than internal passages which can (and do) become clogged after constant usage.

In addition, the piston wall above the top ring has been reduced. This forms a heat block which allows the top ring to run cooler. After cooling oil has secured the upper chamber, it's discharged through exhaust holes and drains back to the sump.

You'll find that the outer shape of the G-583's crown has not been changed. We didn't wish to alter the original combustion chamber design.

The Rings . . .

Ring arrangement consists of three compression and one scraper ring above the pin, one oil ring below the pin. This is one less oil ring than was formerly used. We were doubtful at the beginning about dropping the second oil ring. So we decided to check it out on a test piston. Oil consumption tests proved conclusively that the additional oil ring is not necessary.

Establishing Clearances . . .

Upper end of G&E's piston—that is the ring land area—is tapered to compensate for the differences in temperature (and amounts of expansion) from the top to the bottom of this area. Similarly, the skirt is taper-ground to compensate for expansion difference.

Since the alloy iron pistons would expand with temperature much less than aluminum ones do, cold clearances could be reduced. Liner-to-piston clearance at the top land is 0.051—0.054-in. and skirt-to-liner clearance is 0.010—0.012-in. These figures are based on a nominal 9-in. bore. Since the values are considerably less than those for aluminum pistons, tendency for piston slap is reduced when the engine is cold.

Added clearance is provided in the pin-hole area by a machined relief. Piston pin caps retain the pins and these, too, are relieved to prevent the caps from contacting the liner walls if they should become distorted. This pin-hole relief is tapered to eliminate a line contact between the relief run-out point on the skirt OD and the liner wall.

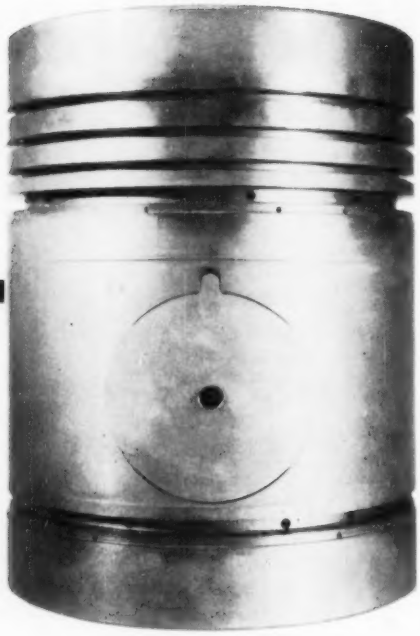
The Weight . . .

Final design consideration pertained to the piston's weight. We were quite certain from the beginning we would not be able to match the 40-lb aluminum piston. This was borne out during the weight check of our preliminary design. First weight came to 58 lb.

However, we went back over the design, peeling off material internally until we were down to the present weight of 54 lb. We felt this was as low as we could possibly get—without endangering the structure of the piston—and believed it necessary to run test pistons before doing anything further to reduce weight.

Since the newly-designed pistons were 13.57 lb heavier, there was question as to the effect of this

(*Continued on page 92*)



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The Material . . .

First of all the materials going into the new piston had to be decided upon. For many years G&E has specialized in high-strength alloy iron, so we selected this type for our new piston. This alloy guarantees a minimum tensile strength of 53,000 psi. (And it's not uncommon for test bars to check out at 60,000 psi. Brinell hardness is in the range of 230 to 290.)

The Casting Design . . .

Next question considered during preliminary design work was the general casting design. Here at G&E we've had experience making pistons of almost every shape imaginable, both external and internal. So, we weighed the particular advantages as well as disadvantages of

using an intricately ribbed design . . . or using a simple design.

Rib Design Examined . . .

Pistons having many radial ribs extending from the center of the undercrown to the piston sidewall certainly have cooling advantages. But, they also present certain design problems. Sometimes, for instance, in order to create an oil passage near the outer wall a series of cored holes through these ribs are used. Picture all of this, if you will, above the baffle plate which forms an oil chamber. To manufacture a piston of this design it's generally necessary to invest in several coreboxes. Matter of fact, it may require a rather complicated core assembly and it definitely creates a costly cleaning problem.

Let's elaborate on the cleaning problem a bit. Generally you'll find fins on complicated core assembly jobs. These fins must be removed or they break off in service and wash into a critical area with the cooling discharge. Also, all of the spent core sand must be completely removed for the same reason. This is not an easy task when one considers the relatively small opening in baffle through which the cleaning has to be done. All of the foreign material must come out. This is time-consuming and consequently costly.

Generally—in order to cut down on weight—the radial type ribs on the undercrown are relatively thin with rather small fillets at their adjoining corners. Joining a thin rib to a heavier wall is contrary to good foundry practice. These adjoining areas will set up severe internal stresses and are apt to be subject to porosity. And, all of this is going on in an area already subject to high pressure.

Simple Design Picked . . .

By this time you can see why the simpler design won out. Advantages of the simple design, in our opinion, far outnumbered those of its more complicated cousin. Let's take a close-up look at our simple design.

G&E's piston is clean internally with a minimum of parting lines, ribs, etc. With a firing pressure of 1350 psi, the piston must transmit approximately 86,000 lb to the pin and connecting rod. We incorporated three main continuous ribs from the pin bosses to the piston undercrown to carry this tremendous load.

Then we added two reinforcing ribs across the undercrown which also provided additional cooling area. Ribs are blended into sidewalls and undercrown so as to produce a minimum of internal stress. Each piston is pressure-tested to 80 psi of water to insure against porosity. Its baffle plate opening is elongated to provide easier cleaning of the upper cooling chamber.

Simplicity of design eliminated coring fins—but it is still necessary for this area to be completely freed of core sand. Baffle closure, consisting of a flat steel plate and gasket, are bolted and safety-wired in place. At G&E we prefer using a gasket to seal off the relatively rough-cast bottom surface rather than go to the expense of machining it.

Cooling—Critical Design Problem . . .

Oil-cooling system for the new cast iron G-583 is basically the same as that for an aluminum piston: oil is pumped through the connecting rod, wrist pin, and upper chamber. However, the cast iron piston has a larger cooling area exposed to the oil. This is because the cocktail-shaker design is used rather than internal passages which can (and do) become clogged after constant usage.

In addition, the piston wall above the top ring has been reduced. This forms a heat block which allows the top ring to run cooler. After cooling oil has secured the upper chamber, it's discharged through exhaust holes and drains back to the sump.

You'll find that the outer shape of the G-583's crown has not been changed. We didn't wish to alter the original combustion chamber design.

The Rings . . .

Ring arrangement consists of three compression and one scraper ring above the pin, one oil ring below the pin. This is one less oil ring than was formerly used. We were doubtful at the beginning about dropping the second oil ring. So we decided to check it out on a test piston. Oil consumption tests proved conclusively that the additional oil ring is not necessary.

Establishing Clearances . . .

Upper end of G&E's piston—that is the ring land area—is tapered to compensate for the differences in temperature (and amounts of expansion) from the top to the bottom of this area. Similarly, the skirt is taper-ground to compensate for expansion difference.

Since the alloy iron pistons would expand with temperature much less than aluminum ones do, cold clearances could be reduced. Liner-to-piston clearance at the top land is 0.051—0.054-in. and skirt-to-liner clearance is 0.010—0.012-in. These figures are based on a nominal 9-in. bore. Since the values are considerably less than those for aluminum pistons, tendency for piston slap is reduced when the engine is cold.

Added clearance is provided in the pin-hole area by a machined relief. Piston pin caps retain the pins and these, too, are relieved to prevent the caps from contacting the liner walls if they should become distorted. This pin-hole relief is tapered to eliminate a line contact between the relief run-out point on the skirt OD and the liner wall.

The Weight . . .

Final design consideration pertained to the piston's weight. We were quite certain from the beginning we would not be able to match the 40-lb aluminum piston. This was borne out during the weight check of our preliminary design. First weight came to 58 lb.

However, we went back over the design, peeling off material internally until we were down to the present weight of 54 lb. We felt this was as low as we could possibly get—without endangering the structure of the piston—and believed it necessary to run test pistons before doing anything further to reduce weight.

Since the newly-designed pistons were 13.57 lb heavier, there was question as to the effect of this

(*Continued on page 92*)

Increased power, lower fuel consumption

THREE NEW GENERAL MOTORS 567 DIESEL ENGINES

New "D" series available in turbo-charged or normally aspirated models

First application for the new "D" engines was announced recently by Electro-Motive for a new and more powerful, more economical line of Diesel locomotives. Four years in development, two of the new engines are turbo-charged, one normally aspirated.

A long list of improvements have been incorporated to give these engines even more stamina, reliability and lower maintenance requirements than their famous long-lived predecessor, the General Motors 567C engine.

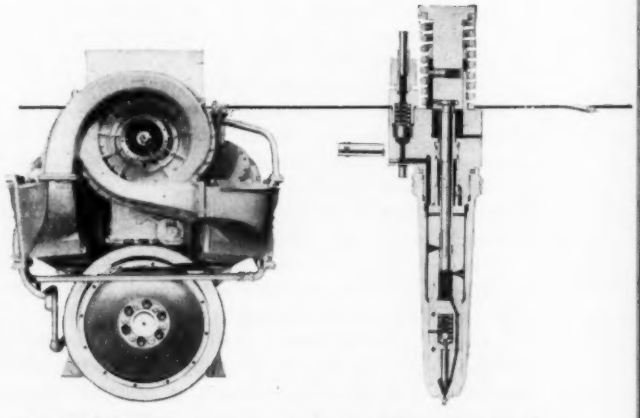
Normally aspirated series

The same fundamental design is used for each engine whether normally aspirated or turbo-charged. As a result, the normally aspirated 567D-1 engine, made to turbo-charged standards, is an engine of outstanding durability and low maintenance. An increase in compression ratio from 16:1 to 20:1 and a new needle-valve injector provide for increased power and fuel economy. Specific fuel consumption at full load is 5 percent less than the previous "C" engine.

Turbo-charged series

The Electro-Motive designed turbo-charger, unlike conventional super-chargers, operates efficiently at low and high engine speeds. This feature is especially important for starting, low load and acceleration. The turbo-charged 567D-2 and 3 engines will not derate over a wide range of altitudes. Under test in actual locomotive service conditions, full engine output was maintained at over 8,000 feet altitude. In addition, the turbo-charged engines reduce specific fuel consumption by as much as 10 percent at full load.

Continual improvement of major components has long been an Electro-Motive policy. These new engines represent more than twenty years of Diesel engine development. They are the finest expression yet of the General Motors 567 series—more powerful, more economical and even more reliable.

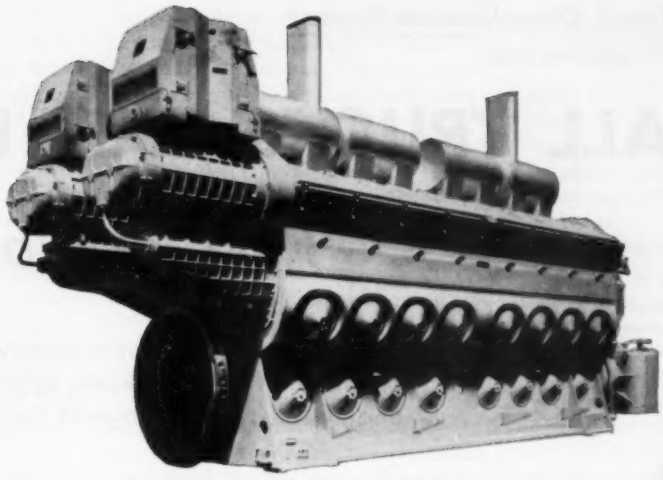


New turbo-charger is Electro-Motive designed and developed. Unit operates from engine gear train at low engine speeds, from exhaust turbine at high speeds. Combination drive provides adequate air supply at all operating levels. Turbo-charger maintains engine output in high altitude operation.

New needle-valve injector gives better fuel atomization and eliminates after dribble, both factors to improve specific fuel consumption. Electro-Motive developed, the new injector is standard on all 567D engines. It is also applicable to earlier General Motors 567 series engines and present spherical valve type injectors can be converted to the new type.

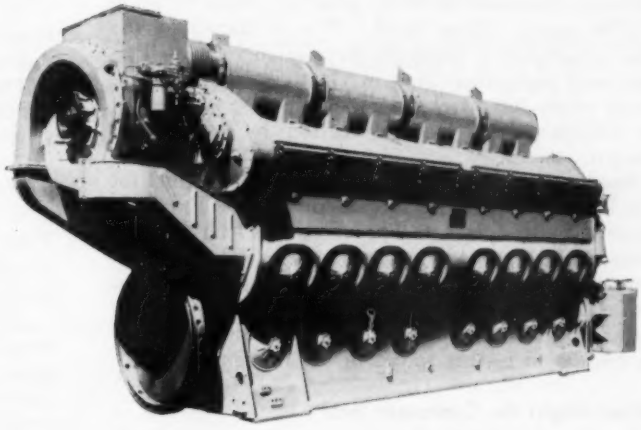
567D-1
Normally Aspirated

1800 tractive horsepower. 20:1 compression ratio. 16-cylinders. First used in the General Motors GP-18 and SD-18 locomotives. 12-cylinder version is used in the new General Motors RS-1325 locomotive.



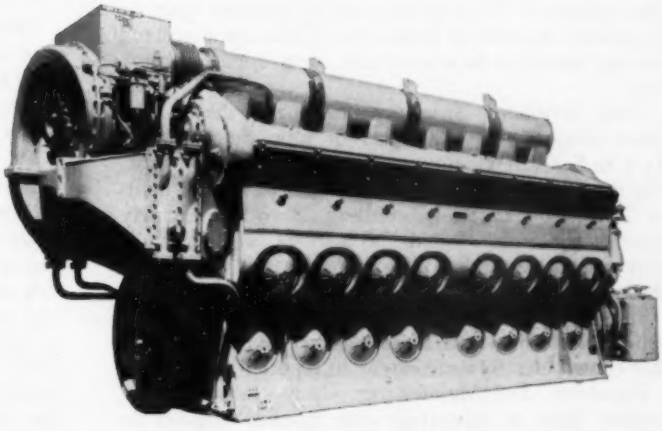
567D-2
Turbo-charged

2000 tractive horsepower. 14½:1 compression ratio. 16-cylinders. First used in the General Motors GP-20 locomotive.



567D-3
Turbo-charged

2400 tractive horsepower. 14½:1 compression ratio. 16-cylinders. First used in the General Motors SD-24 locomotive and MU-60 peaking plant.



ELECTRO-MOTIVE DIVISION · GENERAL MOTORS

La Grange, Illinois *HOME OF THE DIESEL LOCOMOTIVE*

In Canada: General Motors Diesel Limited, London, Ontario

Truck Dieselization Report

An Objective Study

ALL TRUCKS CAN BE DIESEL —

Fact or Fancy?

by E. R. Klinge,
Executive Engineer*
Advanced Truck Engineering,
Ford Motor Company

A significant and provocative viewpoint on the proposition of broadening application of diesel engines to a wider range of truck types and sizes.

*Abstract of a paper presented by the author at a Metropolitan Section, SAE, Meeting in New York City, January 7, 1960.

Practically all diesel engines used in the domestic truck industry to date have been in extra-heavy models. This, however, has not been the case in Europe where demand continues for diesel-powered trucks of lower GVW ratings. Since World War II the diesel has been applied to succeedingly lower-rated vehicles. This has been particularly true in Great Britain and Germany where the diesel outsells its gasoline counterpart in vehicles rated at two to three tons by a substantial margin.

Implications of the title are somewhat "fanciful" for the USA as we now see it, even though the European scene is quite different. The question which deserves examination, however, is whether there is basis to believe that broader diesel application in transportation will occur in this country as it has in Europe. It is proposed to examine important factors as they now stand in relation to further spread of diesel engine usage.

What Might the Customer Get?

In general, a diesel will provide a major improvement in fuel economy over the gasoline engine as well as a significant improvement in durability and reliability of the equipment. These gains must be balanced against a significant increase in initial cost. These are the determining questions to a successful diesel engine application.

Fuel Economy—Truck application of diesels will show economy improvements in mpg ranging from 35% to 65%, depending upon the application and use. For example, the accompanying chart shows that lighter loads, and particularly idling, provide extremely large savings in relation to full load. Principal implication is that it is not heavy-load applications which offer the most savings, a story not commonly understood.

In many diesel applications, a major compromise in vehicle performance is sometimes acceptable and this fact contributes to some extent to reported economics.

Durability and Maintenance Costs—Typical diesel engines have an advantage over gasoline engines in durability, reliability and low maintenance cost. Improvement is the result of two main factors—inherent characteristics of the engine and traditional design approach which emphasizes long life and durability. In regard to the latter, it would seem that diesel engine designers have had difficulty in realizing cost reductions by sacrificing durability. Room for improvement in costs may lie in this area. As to long-life characteristics, it may be said that three factors are involved:

(1) The injection system is normally more reliable than the ignition system and curburetor it replaces.

(2) Internal engine temperatures are usually lower and more uniform.

(3) Exhaust temperatures are lower and exhaust valve problems are infrequent.

Considerable experience in the extra-heavy truck field has indicated that diesel maintenance expenses can be 25% less than that of comparable gasoline engines. Very limited experience is available for lighter-duty service but indications are that even greater savings may result, perhaps as high as a 50% advantage.

Size and Weights—Typical diesels will weigh between 50% to 100% more than gasoline engines of the same horsepower. Due to difference in engine torque characteristics, a somewhat lower horsepower rating is usually used to do a given job than is the case with a gasoline engine. This factor reduces the weight penalty in a given installation to a number approaching 50%-75% weight increase for the diesel.

More significant in many cases is the difference in engine sizes and configurations which may make installation problems in housing the diesel. Severity of the problem can only be reviewed case by case and generalizations may be meaningless.

Engine Application Factors to Consider . . .

Comparisons given appear more unfavorable to the diesel than is actually the case. Quite often, maximum horsepower is not so critical in automotive engine selection and torque is a more useful basis for comparison. The diesel usually has the advantage of a very flat torque curve. Additionally, commonly-quoted horsepower between diesel and gasoline engines are not comparable. This is not a question of falsification but rather one of identifying the conditions for which the ratings apply. Net installed horsepowers are a considerably more reliable index for comparison. Generally speaking, a diesel engine net installed power will be 85% of gross power while the gasoline net installed power may be as low as 70% of gross power.

This results in a considerably smaller diesel being

capable of doing a more effective job in a truck than would be anticipated by examining only apparent facts. Performance data on a smaller truck with a diesel rated 110 hp and a gasoline engine rated 172 hp is shown. Performance is nearly identical except for maximum speed. This demonstrates necessity for caution in comparing gasoline and diesel engines.

Costs—Diesels will generally cost about twice as much as equivalent gasoline engines for similar service and tooled for equivalent production volume. This cost difference will be considerably larger if low-volume diesels are compared to high-volume gasoline engines. Principal factors contributing to the high cost are: injection equipment; heavier construction associated with high combustion pressures; and a longer-life, durability objective. This cost may be additionally aggravated by a higher torque-capacity, more-expensive driveline.

Exhaust—The diesel has a real exhaust problem. It also has some inherent advantages in this respect, not generally recognized. Smoke is generally regarded as a problem but its control is possible. Proper engine rating, good maintenance and proper operation can prevent smoke. A second objectional factor, with no known solution, is exhaust odor. However, diesel exhaust contains no poisonous carbon monoxide and its emmission of unburned hydro-carbons is considerably less than in gasoline exhausts.

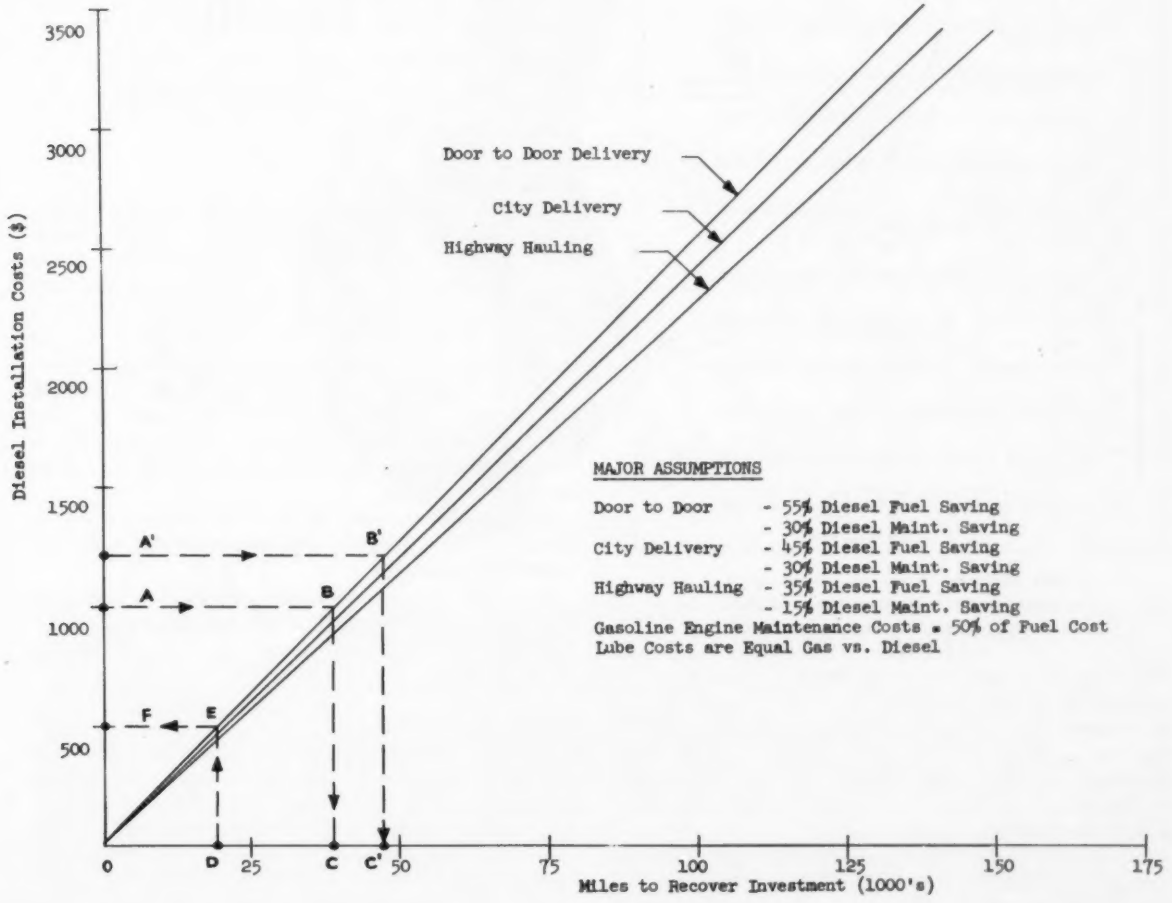
Starting—Diesels commonly present a more difficult cold-starting situation. Cost of larger cranking motors and larger batteries must be included in the "plus" cost of the diesel installation. To this must be added cost of starting aids and pre-heating devices usually required when temperatures approach freezing or go below.

Noise and Vibration—Diesel engines are inherently inferior to gasoline engines when it comes to noise and vibration. For commercial use, these problems can be kept to acceptable levels with proper installation.

Simple Economic Analysis for Application . . .

As stated, primary value of the diesel is in reducing fuel and maintenance costs at the expense of added investment. Balance of these important factors in the cost of ownership establishes the resultant economic feasibility of dieselization. It is important that such costs be determined accurately since a shift of 10% either way could affect a decision to employ a diesel engine.

Chart for estimating investment recovery time. Demonstrating use, the following are case assumptions for door-to-door delivery service; $1000 incremental cost; 20,000-mi/yr; 6000# GVW avg. load; 20% return on investment. Lines AB to BC indicate mileage (39,000) to recover investment less return. Lines A'B' to B'C' indicate mileage to recover investment plus 20% return (approx.) C' (47,000 miles) or 2-1/3 yr to pay off under case assumptions. Lines DE to EF indicate potential yearly savings after investment is ammortized.



In general, more truck products could potentially utilize diesel engines. Relationship of fuel and maintenance costs to total cost of ownership is practically the entire determinant on commercial vehicle usage. Heavy truck application is already established. There are other areas not currently using diesel engines which are potentially attractive. Following operational characteristics would seem to indicate a desirable hunting ground.

(1) Those operations incurring high annual mileages in excess of 75,000 miles per year. In addition to heavy cross-country hauling, other high-mileage operations exist where diesel engines have not yet penetrated.

(2) Operations incurring only moderate mileages, 25,000 to 35,000 miles per year, but also including a large amount of time with light engine loads and idling.

(3) Those operations similar to (2) but that include retention of vehicle for 6 to 10 years or longer.

(4) Operations incurring annual mileages of 10,000 to 15,000 miles per year but also including vehicle retention as long as 15 years. (*Another case to consider here is where engines serve dual purposes—driving pumps, packing machinery as in refuse hauling, etc. Mileage may be low but engine hours high.—Ed.*)

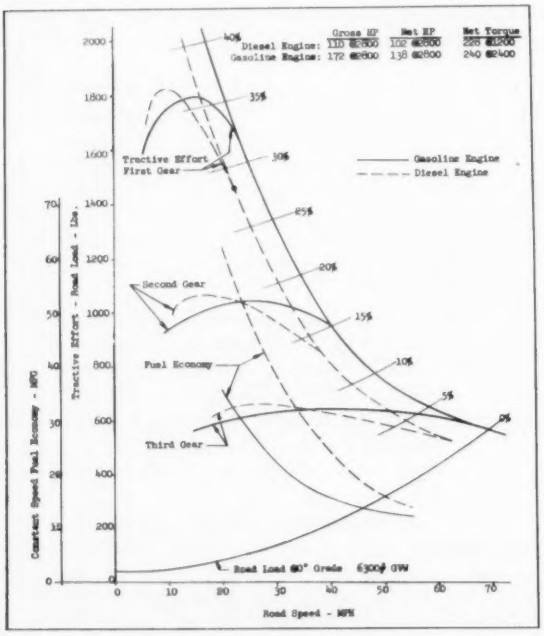


Chart indicates lower hp diesel gives very comparable performance and fuel economy except for maximum speed.

Reasons for identifying these operations as potentially attractive for the diesel are: (1) that a diesel should be analyzed for its expected lifetime usefulness rather than on a miles per year basis; and (2) diesel fuel economies are even more marked for light-load than for heavy-load application. It would be interesting to analyze the following specific uses:

(1) *Door-to-Door Delivery—Retail* Moderate annual mileage, part-load use, extensive idling, moderately long vehicle retention.

Here's a brief rundown on the percentage of diesel trucks—rated by payload—in five representative countries.

RATED PAYLOAD	USA	ENGLAND	GERMANY	FRANCE	SWEDEN
1700#	0	1.1	0.1	0	0.1
3500#	0	12.0	64.3	0	6.2
5400#	0	56.8	99.0	1.0	4.9
10000#	0	87.4	99.9	49.3	32.8
12000-18000#	0	95.0	100.0	50.0	81.8
20000-35000#	0.1	99.8		99.0	96.0
38000-Over	40.0			100.0	

(2) *City Delivery Operations—Wholesale* Moderate annual mileage, part-loaduse, some idling, moderately long vehicle retention.

(3) *Highway Hauling—Light-Load, 35,000 lb* High annual mileage, characterized by car haul-away service.

(4) *City Refuse Hauling* Low annual mileage, extensive part-load operation, extensive idling, extremely long vehicle retention.

A simple chart has been prepared to show primary economic factors as they are related to the potential market for diesels. This chart, based on averages of currently available data, permits assessment of total miles required to break-even and to recover added diesel installation investment. To illustrate its use a simple case history is shown for door-to-door delivery. Basic assumptions are given.

Some Roadblocks . . .

Despite growing interest in diesels and the obvious advantages associated with their use, it is quite reasonable that truck operators might logically question desirability of diesels for applications which heretofore have employed gasoline engines. Probably the three most important reasons suggested as to why the diesel had not gained popularity in such applications in the USA are:

(1) The fact that most fleet maintenance operations are geared to service gasoline-powered trucks. In other words, there seems to be resistance on the part of service mechanics due to unfamiliarity with the diesel engine.

(2) Lack of an adequate diesel powerplant being offered to fit this particular market application as factory-installed equipment.

(3) The varying practice of amortization; some operations write off purchase of new equipment on an extremely short cycle even though equipment is retained for many years.

Future Diesel Engines . . .

A diesel is a tool to be used in saving money through providing lower cost transportation. To be increasingly successful at this, diesels must make progress in certain areas. Chief among these are cost, size and weight. These become increasingly important as the vehicle size in which installed goes down.

(*Continued on page 98*)

GENERAL MOTORS PARTS for General Motors Diesel Engines

A precision-built piston and rod assembly for a GM Diesel engine

GENUINE General Motors parts, precision-built according to factory design, will prove to be the best wherever replacement parts are necessary.

To insure the best and most economical operation of a General Motors Diesel engine, we recommend the use of genuine General Motors replacement parts, installed by factory trained servicemen.

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Thrifty Scots Switch To Small Diesels!

Loaded with 2-ton of milk, these 3-wheel Bedfords (powered by 2.2 liter Standards) are ready to begin day's work. Large glass area lets drivers keep track of kids.

For hauling service of all types — right down to door-to-door delivery of milk and bread—diesels pay off for British in fuel and maintenance economies.

story by Leo Walter

Comparative Operating Figures—1959
Gasoline vs. Diesel For 2-Ton Van

St. Cuthbert's Mr. Prentice indicated that initial costs for 2-ton vans were extremely close: $2,547 for the diesel; and $2,264 for gasoline-powerd version. Depreciation was figured for the diesel van at 10-yrs; on the gasoline van at 6-yrs. Many costs, of course, remained the same for both vehicles—the insurances, overhead, licences and the wages. As for interest, it also balanced out since diesels offered a longer life.

About tires, Mr. Prentice said, "Our diesel's get longer tire wear due to slower, smoother accelerations No jack-rabbit starts for them!"

Repairs: "Our repair costs for diesel averages 1/2 that of gasoline engine—overall engine wear is 3 to 5 times less!"

MPG: We are getting 3 times better fuel consumption with diesels than from gasoline engines in our stop-start operation."

There are good economic reasons why many British trucks have been dieselized during the past few years. It should be of interest to American owners to obtain some information about operational experience and costs that created this trend.

Data for this article was obtained from one of the most progressive transportation departments in the British Isles. It is operated by Scotland's largest retail society, St. Cuthbert's Co-operative Association, Edinburgh. Mr. A. Prentice, transport manager, supplied the information.

St. Cuthbert's is believed to be unlike the general scheme of merchandising in the United States. Members of this large consumer organization can get a range of products from foodstuffs to coal and other heavy bulk materials. Since these are taken to the consumer, transportation is a major factor in the operation.

This means a great deal of door-to-door service. In the case of products such as meat, grocery, dairy and bakery goods, the driver is also a salesman. In some respects, this is similar to your American milkman with his sales and delivery route.

It is not important to this article to discuss the differences in merchandising methods further. The point is that the type of service is short-trip, stop-start service. Therefore, wherever this type of service is encountered, there is no reason why the diesel-powered vehicle should not work out to be the most economic type.

Size of vehicle, at least in Great Britain, is not a factor. St. Cuthbert's has diesel trucks from a small 3-wheeler for milk delivery up to large diesel trucks for heavy bulk materials. Mr. Prentice points out that gasoline engines have not been an economic unit for door-to-door operation. The small diesel has proved to have superior qualities as to both fuel economy and long life.

1959 Operating Costs: (3-wheeler Bedford Milk Van, 3-cyl Perkins diesel conversion)

	Yearly Cost
Depreciation per year (10-yr. life)	$143.31
Licences	85.56
Interest	25.46
Insurance	28.10
Rents & Taxes (garage)	140.50
National Insurance	78.05
Fuel costs (240-mi per week, 12,480-mi per year at 30 mpg) at 52¢ per gal. or yearly figure of	211.87
Tires	73.06
Oil & Grease	21.19
Repairs (45% labor, 55% parts)	146.12
Total	$953.94

1959 Operating Costs: (2-ton Bread Van, 2.2-liter Standard Motors diesel.)

	Yearly Cost
Depreciation per year (10-yr life)	$230.32
Licences	91.96
Interest	35.03
Insurance	25.80
Rents & Taxes (garage)	169.80
National Insurance	78.05
Fuel costs (325-mi per week, 17,472-mi per year at 28 mpg) at 52¢ per gal. or yearly figure of	325.59
Tires	79.15
Oil & Grease	30.24
Repairs (45% labor, 55% parts)	217.58
Total	$1283.52

Some light diesel trucks used . . . .

Some of the light trucks have 3-cyl diesels and some have the Standard Motor's 2.2-liter, 4-cyl unit. Both engines have about the same power, 30 bhp at 2200 rpm. Gearing and tire size is adjusted to give the required performance.

For example, on the 1½-ton Bedford truck, 9.00 x 16 tires are fitted. They give good stability and cushioning and up to 2-ton of bottled milk can be carried. On these small trucks, turning radius is so short that even in congested areas reverse gear is rarely ever required.

Part of the fleet of 3-wheelers were converted to diesel operation in 1953. Operating costs are tabulated.

It's mighty easy to work on this Perkins Four 99 installed in Bedford van.

In bread delivery, 2- to 2½-ton vehicles are worked in two shifts. They sell bread during the day and make bulk bread deliveries at night. These vehicles have a Ferguson (tractor) 2.2-liter diesel fitted under the floor. Operating costs are tabulated.

Latest vehicle put into operation is a 1½-ton Ford van with a Perkins Four-99 1½-liter diesel installed in place of the standard gasoline engine. The van was built to the design of St. Cuthbert's Transport Department. It is quite similar to the 2-ton vans but has only a little over half the capacity.

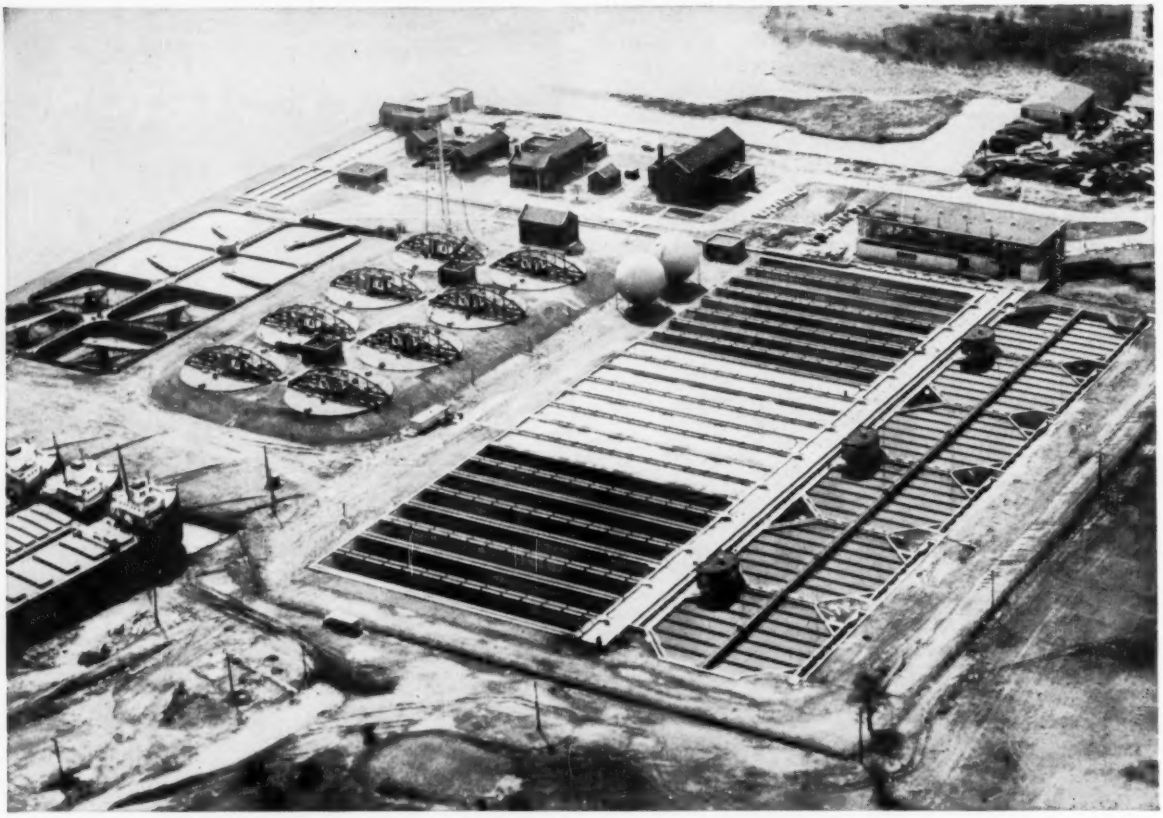
Extensive tests were carried out before the Perkins engines were installed. One engine ran for over a year in a Bedford van on double and sometimes triple shifts. According to Mr. Prentice this vehicle has now done some 100,000 miles without any major work or special attention. Average vehicle load is 1400 lb and fuel consumption has been a consistent 40.8 mpg while working in city traffic.

Operational comments . . . .

Mr. Prentice states, "In operation of bread distribution from door to door we prefer to measure our fuel consumption per day. Here, this small diesel engine does three times better than its gasoline counterpart. This we think is the roughest test—intense stop/start.

"Generally speaking, we find the small diesels wear at least four times longer than the gasoline engines on

Perkins Four 99 is accessible from front and rear for easy maintenance.



Aerial view of the Toledo disposal plant. Primary facilities built in 1932 are at left and the new secondary facilities are at right. Round tanks in center store sewage gas used to operate engines.

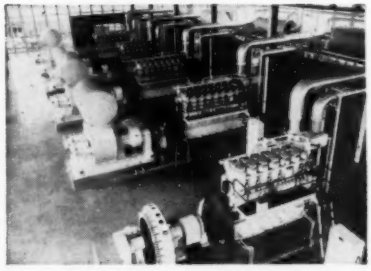
TOLEDO SOLVES POLLUTION PROBLEM . . . THANKS, IN PART, TO BENDIX FUEL INJECTION

For many years the City of Toledo has been discharging its sewage into the Maumee River. While this solved its sewage problem, it created an even greater one of pollution. To lick this threat to health and sanitation, Toledo recently completed a $9,500,000 secondary sewage plant. Now, sewage pumped into the Maumee is as pure, if not purer, than the river water!

Power for the principal equipment of the new facilities is provided by five Enterprise Model G Tri-fuel Engines—equipped with dependable Bendix* fuel injection. These engines are designed to operate on diesel fuel, natural gas or sewage gas or a mixture of these. Through means of a calor-optic unit the BTU content of the sewage gas is raised by mixing with natural gas. Use of sewage gas for fuel results in an annual saving of $50,000!

With sewage disposal, as with any other application involving low-cost combustion power, Bendix is the right choice for fuel injection. That's the reason so many diesel manufacturers specify Bendix. Why don't you?

*REG. U.S. PAT. OFF.



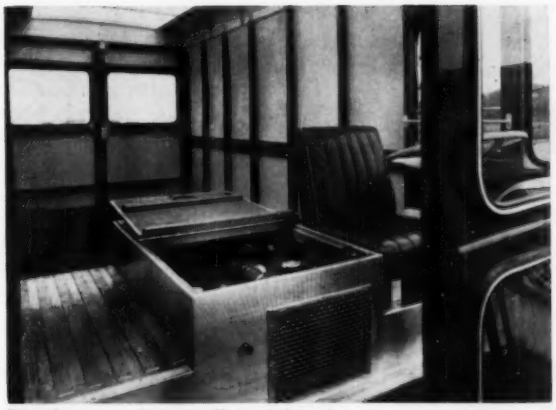
Here are the five Bendix-equipped Enterprise Tri-fuel Engines. Four drive blowers provide air for sewage separation tanks. Engine in foreground powers generator for emergency electrical power.

Scintilla Division

Sidney, New York

Bendix
AVIATION CORPORATION

Export Sales & Service: Bendix International Division, 205 E. 42nd St., New York 17, N.Y.



Diesels outnumber gasoline engines in Europe in low GVW vehicles from two to three tons.

Note novel mirror locations on this Ford bread delivery van . . . lets driver look directly behind.

stop/start work and maintain their economic efficiency much better."

Arriving at operational costs . . . .

Figuring operating costs is a complex problem and results reflect to a great extent the accounting method used. It is therefore necessary to detail the factors involved and how they are allocated. By so doing, a framework for comparison is provided.

Mr. Prentice points out that the purpose of his cost records is to show total cost of operating each vehicle or type of vehicle. This is then applied to the particular commodity carried such as per ton-mile, per passenger mile, per gallon of milk, per bag of flour, per parcel, or per dollar of sales, etc., and charged to the product as a cost item.

With actual vehicle operating costs known, transport use can be charged to departments on the basis of a rate per hour per vehicle, with or without driver, or at a rate per vehicle mile. Also, where radius of operation is known, a rate per hour per weight class of vehicle can be charged.

An advantage of this last method is that it gives departments an incentive to make the best possible use of the vehicles in the time they are at their disposal.

This is why it is so important to know actual vehicle operating costs. Once determined, each vehicle's operating costs are revised from time to time, say every six months, to keep them current.

Also, these figures are valuable in comparison studies of gasoline versus diesel units, of different vehicle and engine types, makes and capacities. They are also valuable in determining whether owned or hired vehicles would be more profitable or, what is most important, the desirability of hiring to meet peak periods as against keeping spare vehicles.

How St. Cuthbert's figures costs . . . .

Methods of accounting vary with different fleets. Most firms want to write off a new vehicle as quickly as possible but in any case, average vehicle "life" in each weight class must be considered. In the accompanying cost charts, a 10-year life was taken with "straight-line" depreciation.

It is customary in Great Britain in vehicle cost analysis to treat tires as a running expense as they may be shifted from vehicle to vehicle. Therefore, initial cost of the vehicle for depreciation purposes should be less the cost of a set of tires. Individual tire records, including mileages, are kept so that cost per mile can be computed.

Interest is another fixed charge. As the capital amount is gradually being reduced, the amount fixed for interest could also be reduced. In this case it is preferred to take an average or one-tenth of the full interest charge as a uniform yearly cost item.

Comprehensive insurance is carried. Maximum carried will depend on the value of maximum loads carried plus normal vehicular insurance.

Overhead must be charged against each vehicle in proportion to its size. This would include rents, taxes, etc., and all items of expense that cannot be debited to any other main heading. Amounts here can be considerable and range from $85 per year for a ¼-ton vehicle to over $200 for a 6-ton vehicle.

Operating costs are those incurred in the actual running of the vehicle and include fuel, lube oil, tires, maintenance and repairs.

Totals of fixed and operating costs on two types of vehicles are given. To these must be added driver wages. These were not included as they vary so greatly in different parts of the world. Yearly salary plus vacation pay and other fringe benefits paid by the employer must be added.

Concluding . . . .

From the operational experience of one of the large fleet owners in Great Britain, it would appear that the tempo of dieselization in the U.S. should be accelerated, particularly for small commercial vehicles. It seems that there is no engine better suited for light vehicles in stop-and-go service than the diesel.

The fleet of St. Cuthbert's has both gasoline and diesel vehicles in operation in the same service. From Mr. Prentice's statements and the data that he was kind enough to supply, it is clear in which direction future developments tend. From their smallest to their largest trucks, it will be diesel power.

REPOWERING PAYS

Pays Whom? Here is an interview that shows it pays both the truck owner and also the engine distributor who is alert to this huge potentiality for engine sales and aggressively goes after it.

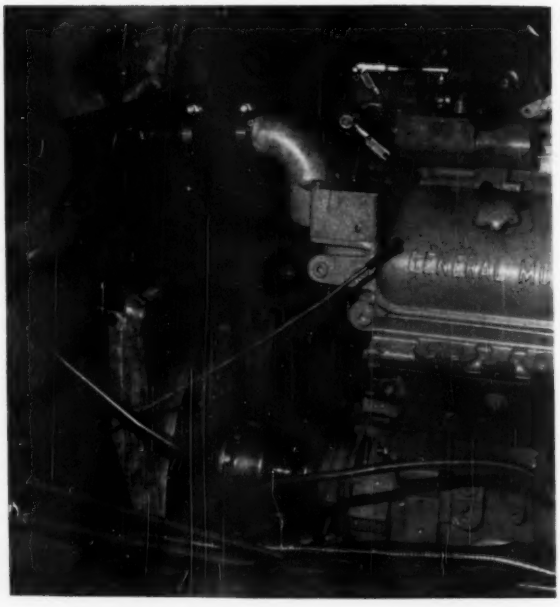
This 650 GMC was repowered with a 6V71. That's George Bennett its owner on left, Dobbs' Roy Galloway on right.

Since the first of the year, Dobbs GM Diesel, Inc., has completed over 22 truck conversions. Fourteen of these have been 6V-71 and 8V-71 installations. Dobbs is located in Denver, Colorado with a branch at Fort Morgan and one at Casper, Wyoming. The interview was with Dick Jefferies, sales manager. Objective was to get the viewpoints of an engine distributor active in the truck repowering business.

"How do you see the truck repowering market?"

"Right now it is an important and growing part of our business. We feel that we have just scratched the surface so far and the potential looks mighty good. Another way of looking at it is that we have sold over 22 engines this year that we wouldn't have sold if we had stuck strictly to industrial sales.

"Of course, truck repowering has been going on for a long time but not at today's volume. There's more



Top of tank has been extended. Note fan arrangement and shrouding. Has dual outlets for maximum efficiency.

emphasis on it today because of the tightening of the transport economic picture and because better, more suitable engines are available to meet a broader range of requirements. Our new GM V6's and V8's are a good example. Additions to GM's engine line opened up new installational possibilities. We believe that we made the first vee installation west of the Mississippi."

"What types of vehicles have you repowered?"

"Practically no two are the same. Several GMC and IHC models, Whites, Diamond T's, Autocars, Oshkosh, FWD's—we've done them all. Services vary from car-hauling, straight trucking, tankers to cattle and grain hauling. This speaks well for the flexibility of today's diesels. On the other hand, it calls for a lot of application engineering and tests the ingenuity of the shop.

"One bright spot is that we will soon have data on converting most types of trucks. Once we've done one, the next comes easier—and, of course, it will be cheaper for the customer. Kits for popular truck models are the eventual answer. Right now, we wish we had more options from the factory on various accessories, particularly manifold shapes. We have to do a lot of fabricating of mounts, brackets, manifolds and the like."

"You engineer each conversion?"

"Yes, you have to in order insure customer satisfaction. You start right with rating . . . how much power does the customer *really* need? Power requirements can vary from area to area. The engine distributor in each area is in a unique position to know local requirements and tailor power accordingly. Here, we are high so derating for altitude enters the picture. Also, routes traveled are mountainous and more power is required than in low, relatively-flat country. So proper rating is important."

"What about the actual conversion work?"

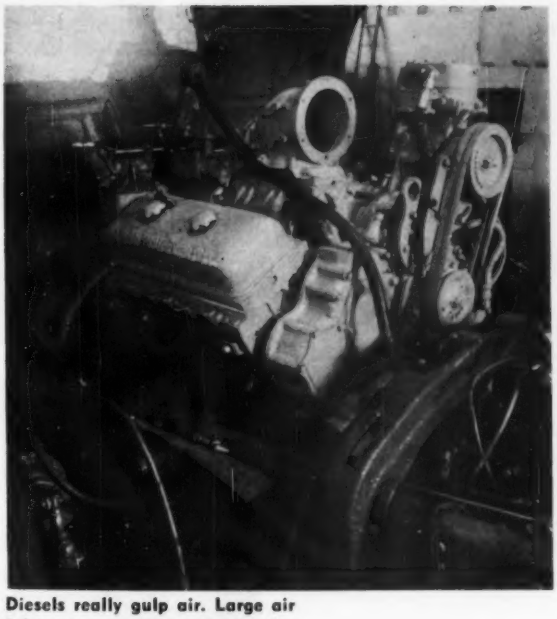
"That's engineered too. We make a thorough inspection of the truck and driveline . . . everything that will affect the conversion. Then we figure what has to be done to give the owner the performance he requires. When we know what's required and what has to be done, we can make a firm proposal to the customer.

"Here's one of our proposal forms (shown). It will give you an idea of the details figures. It's not as complete as the data obtained for engineering the job . . . tire sizes are not listed, for example. When we get the job, we work out complete details—mounts, vibration isolation, radiator rework needed, intake and exhaust piping runs, fuel lines, everything. Then the shop takes over."

"What particular items have you found to require special attention?"

"First, mountings. We give their design a lot of attention both to insure proper support and to control vibration. One nice thing about the vee's is their smoothness. Damping then is simple compared to inline models.

"Next come the different systems—air, exhaust, cooling. I'm not talking in order of their importance . . . they all have to be right. One thing you can't forget when replacing a gasoline engine with a diesel is that the diesel requires a lot more air. We insist on large enough air cleaners, big enough ducting with minimum bends. Rubber ducting is often used and we're careful where and how it's clamped. We have used a lot of "Donaclone" cleaners. Not only do they do a good job



Diesels really gulp air. Large air inlets means minimum restriction.

but we get excellent cooperation from their local representative.

"We are very careful to avoid restriction in the intake and exhaust systems. On vee installations, we use dual stacks and mufflers. Two sets of smaller stacks and mufflers cost a little more than a single exhaust system but we get lower back pressures and more effective silencing. Our customers go along.

"Cooling systems require some reworking. Unless the core is in bad shape it is used. Generally, size is adequate. We occasionally add a larger top tank to increase system water capacity and to reduce aeration. Of course, in vee installations we put in two top and two bottom connections. We've found where a core is marginal in heat transfer capacity that close attention to the fan, the shrouding and proper relative location of the two will give you a satisfactory capacity increase. We like the Vari-Pitch fan and have made several successful installations. They hold temperatures constant, reduce power losses, run quieter and increase fuel mileage."

"You've said nothing about gearing. Is it a problem?"

"It's not been a problem but certainly is a factor that must be checked out. Torque capacity of the units has been ample . . . shift points are satisfactory. Out of the 14 V-71 installations we had to change only one speed ratio. It's been considerably less of a problem than we anticipated."

"All this sounds like a big engineering job."

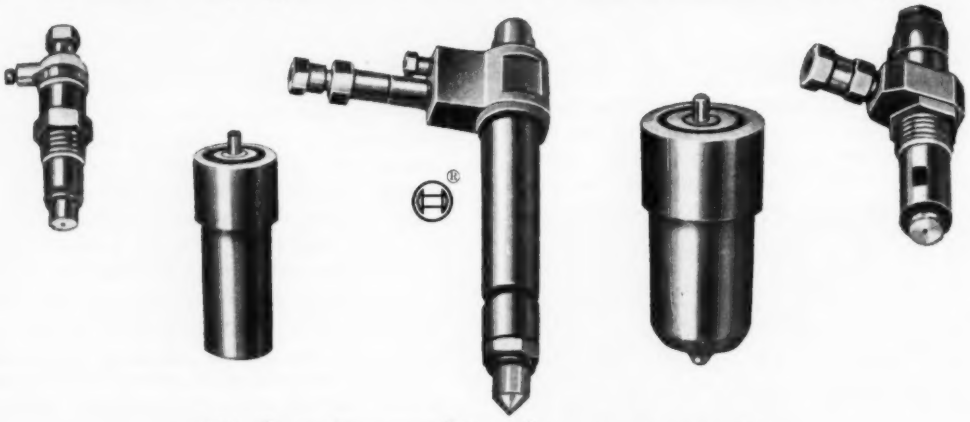
"Well, when we started it was considered a program requiring more thought and engineering than, say, an oil-field or industrial engine application. Now, it's been greatly simplified. As you know, Detroit Diesel has been working on a repowering program for some time. One result has been that an excellent series of engineering aids and manuals are now available to us. Just about anyone familiar with engines and trucks, once they've learned how to use them, can figure a conversion with accuracy."

ROBERT BOSCH

PUTS THE

POW IN POWER

in Fuel Injection Equipment that sets the standard for perfection



Higher in quality—lower in cost

The most highly regarded name in fuel injection equipment—that's ROBERT BOSCH and here's why: Experience dating back more than 30 years in equipment made to the closest tolerances...perfect performance on millions of engines...quality service the world over... most complete line of nozzles.

ROBERT BOSCH is the fuel injection equipment that made the high speed diesel engine practicable. It is used as *original* equipment by the world's most exacting engine makers, both here and abroad.

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Turbocharged diesel gets ready for installation on another conversion

100,000-mi tilt cab in for checkup. Note novel solution for dual exhausts.

"How long does an actual conversion take?"

"We like to have the truck for 10 days. However, we've done conversions in less. The point is that each has been a new job and we wanted it right. We check out the engines on the dynamometer so that we know they are broken in and ready for any kind of loading. Then after the conversion we give the vehicle a thorough road test. I suppose that when the jobs are more standardized we can cut the time.

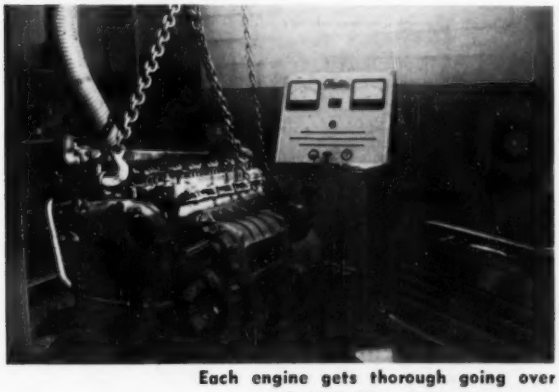
"Our men are getting more familiar with the work too. With one exception all the work has been done right in our shop. This will help the time factor."

"Okay, what does the customer get out of conversion?"

"First, he gets an unconditional 100,000-mile guarantee. This is considerably more trouble-free mileage than they can expect on their gasoline engines. We encourage them, often insist, that the truck be brought in to the shop whenever it's in Denver. We see that it's serviced properly . . . do any minor work such as tuneup that is indicated.

"Next, all of our customers are reporting substantial fuel savings. On the average they report 5½ to 6½ mpg with 50,000 to 75,000-lb GVW. One, at 60,000-lb GVW, reports from 6 to 7 mpg, depending on where he is running.

"Finally, they're pleased with the improved performance. They're always telling us what they can do with the rig that they couldn't do before. Another thing they like is that the rigs are on the road, not in the shop. Fuel savings, lower maintenance and higher availability pay for the conversion. Better performance, often higher hauling capacity, is the bonus."



Each engine gets thorough going over on Dobbs' Clayton dynamometer.

"Let's talk about selling conversions. Do they come hard?"

"I'm not going to say that it's easy . . . some take a lot of convincing. The first few are the hardest. Then you have the "trucker's grapevine" working for you. Get a man that's proud of his rig and is saving money with it and he's on your side. He stirs up a lot of interest. Eventually, one sale leads to another.

"I might mention one thing—selling conversions is a job for the distributor . . . the man who knows local conditions and what's going on. You have to know each trucker's type of business and when to hit him. For instance, the time to see cattle and grain haulers is when they have known business all lined up. Then they're interested.

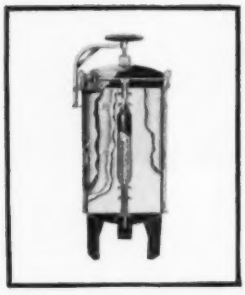
"Another thing the distributor must watch—and check—is credit ratings. There's no sense of going into a deal unless you can expect to get paid. However, there are obstacles and hazards in every business. An engine distributor that knows his territory, believes in his product and what it can do for the customer, and aggressively goes after re-powering business, can make it into a good thing."

"One final question. What about the in-city lighter trucks?"

"We just made our first installation of a 4-53 engine in a Chevrolet truck. This type of installation is not being neglected. We just haven't done as much of it so far as we have with the vee and in-line Series 71 engines. However, we anticipate a great future in the short-haul, light-load service.

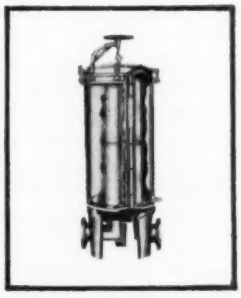
CFC COMPLETE FILTRATION COVERAGE
for LUBE and FUEL OILS
ON ALL ENGINE APPLICATIONS

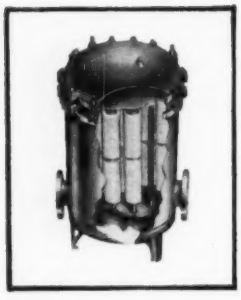
FULL PROTECTION for engine lube and fuel oils, on continuous by-pass or recirculation — the CFC Honan-Crane Multi-Cartridge filter in ten models incorporating nine types of interchangeable *inert or adsorptive cartridges.*



for engine lube oils, on continuous by-pass or recirculation — the CFC Bulk Refill filter in nine models incorporating inert or adsorptive *bulk media* for uniform depth filtration.

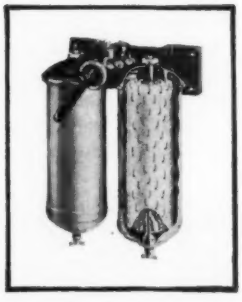
for engine lube and fuel oils, on full flow — CFC Flo-Pac filter in nine models incorporating *pleated resin-impregnated paper medium* for high flow rates, efficient surface filtration.





for engine lube oils and fuels on full flow — CFC Fulflo filters, in many capacities, incorporate genuine *Honeycomb Filter Tubes* of precise densities for controlled depth filtration.

for engine lube oils and fuels, on full flow — CFC Fulflo Duplex filters for continuous filtration, no service down time. Incorporate genuine Honeycomb Filter Tubes.



for engine lube oils and fuels — CFC Michiana filters incorporating *cotton medium.* For restricted space conditions, engines up to 3500 h.p.

Filter out high costs . . . with CFC Filters

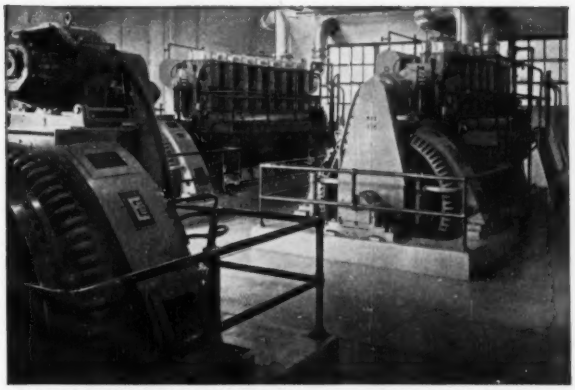
CFC

COMMERCIAL FILTERS CORPORATION

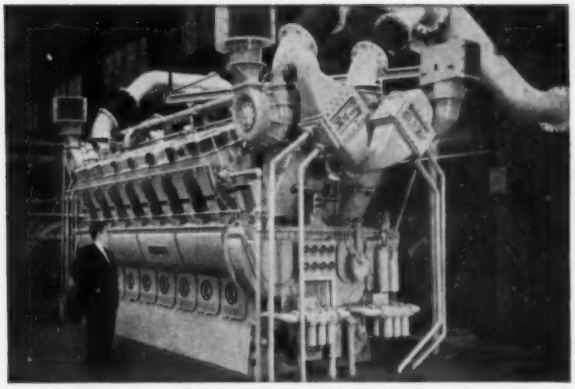
Fulflo Honan-Crane Delpark Michiana

MELROSE 76, MASSACHUSETTS

PLANTS IN MELROSE, MASSACHUSETTS AND LEBANON, INDIANA

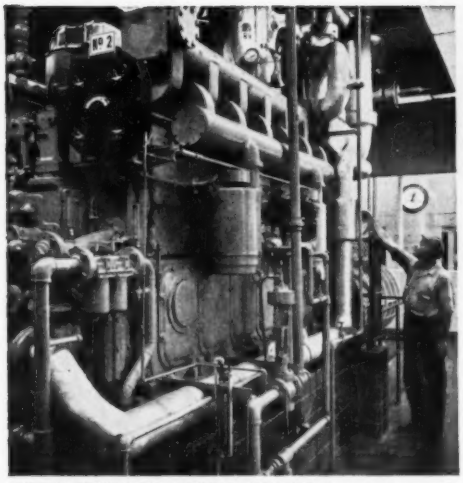


LOW COST MUNICIPAL POWER. Three Enterprise DSG-38 Turbocharged Diesel Generator Sets resulted in $38,000 annual profit for the City of McLeansboro, Ill. Electric rates were cut, plant is quickly paying for itself.

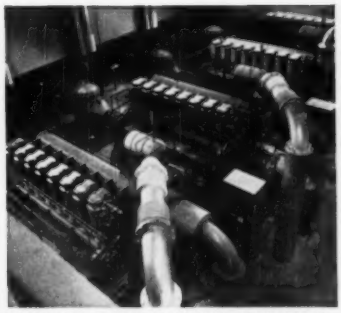


16 CYLINDER RV — WORLD'S SMALLEST 7,700 HP ENGINE — 20% shorter, 30% less weight than conventional diesels of equal power. Can be built as a diesel, dual fuel, tri-fuel, or gas engine.

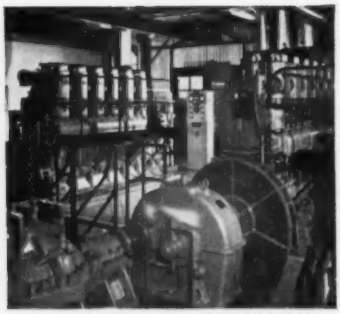
Check ENTERPRISE–the Leader for Every Type of Stationary and Marine Job



BIG SAVINGS IN SEWAGE DISPOSAL. Six Enterprise Spark Ignited Gas Engines, burning sewage sludge gas, replaced purchased power for pumping 40 million gallons of sewage daily through San Diego plant.



INSTANT ACTION WATER PUMPING. Oakland, California licked a storm flood problem by installing four 1200 HP Enterprise Engines. They drive huge mixed-flow pumps, are fully automatic.



PEAK EFFICIENCY FOR PIPELINE PUMPING. Union Oil Company's Ventura Station, powered by two Enterprise 465 HP Engines, is capable of handling fluctuating loads regardless of viscosity changes.

BASIC ENGINE DATA				
ENGINE MODEL	BORE & STROKE	NUMBER OF CYLINDERS	HP	RPM
M	8 x 10	3, 4, 6 & 8	73-1015	450-1000
G	12 x 15	6 & 8	273-2313	250-750
Q	16 x 20	6 & 8	647-2924	250-400
R	17 x 21	6 & 8	767-3467	250-400
RV	17 x 21	12 & 16	1228-7703	200-400

Our product is power—low cost, dependable power designed and proved for the tough, demanding municipal and industrial jobs.

Here are some of the things that officials, owners, operators and superintendents say about their Enterprise power:

"Our Enterprise has averaged 14,000 BHP hours per gallon of lube oil!"

"After switching to Enterprise, estimated savings in fuel alone will amount to $12,000 per year."

"Our operating costs were cut $3,000 per month when we switched to Enterprise Dual-Fuel operation."

"Our Enterprise units were a deciding factor in bringing new industry to settle here."

When you talk to the satisfied Enterprise customers in your area, you'll see why your next engine should be an Enterprise, too. Then call your nearest Enterprise sales office, or write us direct for prompt information and recommendations on your problem.

ENTERPRISE Diesels

THE DEPENDABLE

Enterprise Engine & Machinery Co., Subsidiary of General Metals Corporation
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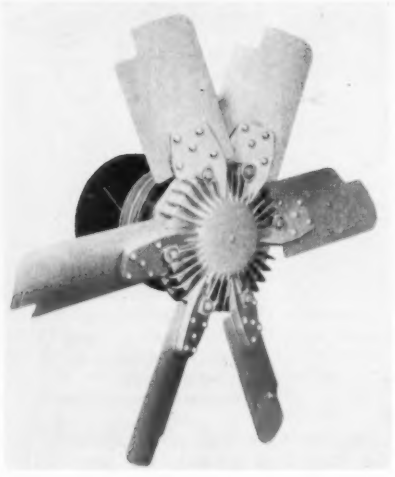
diesel power new products

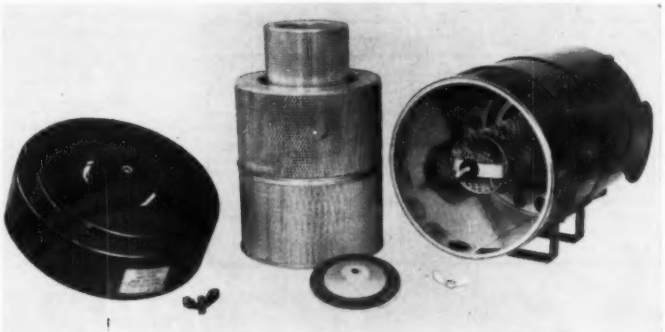
Test Those Crankcase Detergent Oils— this new kit tells you whether it's time to change your filter . . . when it's time for new oil . . . shows you when you've got trouble-making fuel, water or metal particles in that oil. Gerin Corp's improved Model PK4 Crankcase Oil Test Kit is especially designed for practical on-the-job checks of high detergency oils. Simple to use . . . test up to 12 different oil samples quickly, simultaneously and accurately.



Interested In A 10% Fuel Saving — interested in increased hp . . . a longer life for your engine . . . less engine noise . . . and a drop in your maintenance costs? Well this simple compact fan (without external piping or controls to worry about) can turn the trick! Schwitzer's "Thermo-Modulated" fan lets you maintain constant engine temperature— regardless of engine load, truck speed or outside temperature. Means that much of the time your fan will be loafing— and *that* means your fan is not wasting hp. Schwitzer's Thermo-Modulated fan (interchangeable with all conventional fans) works off your input shaft with a temperature-sensitive "fluid-film clutch" varying fan's speed.

Use your dp Reader Service Card.

Purolator's New 2-Stage Dry Air Filter gives "spare tire" safety insurance to heavy duty diesels operating in exceptionally dusty conditions. You'll find two separate elements here, individually sealed and telescoped one inside the other. If your first stage should fail, Purolator's twin element takes over. Protection is provided by plastic impregnated cellulose, rated at 450 to 1150 cfm. Servicing is a cinch —remove, clean and replace the No. 1 element without disturbing No. 2 element.



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PERFECT CIRCLE
PISTON RINGS ARE BUILT
TO TAKE IT

25 BLOWS EVERY SECOND*

*IN ANY 4-CYCLE ENGINE AT 3000 RPM

You can't see the hammer-like blows piston rings receive, but costly results are soon evident when inferior material is used.

Correct metallurgy is one of the most important features of every Perfect Circle piston ring. Over six different metals are used at Perfect Circle...each material the highest strength compatible with the specific application...each material selected for utmost protection against breakage.

Correct, proven metallurgy is another reason why Perfect Circles are preferred and installed with confidence by leading engine manufacturers and mechanics everywhere.

PERFECT CIRCLE

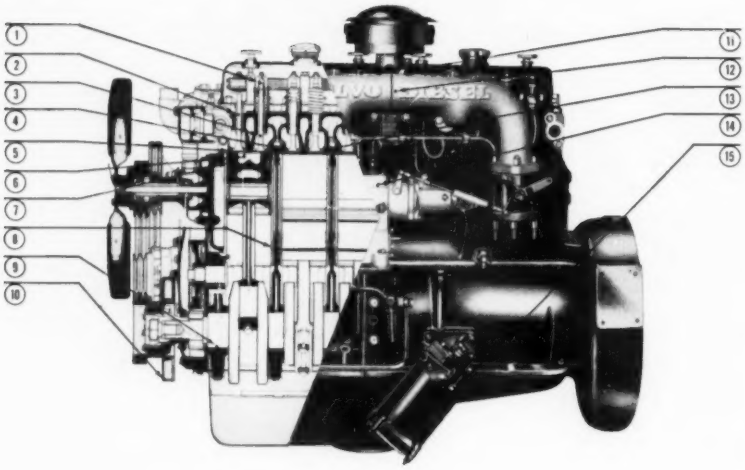
PISTON RINGS · PRECISION CASTINGS · POWER SERVICE PRODUCTS · SPEEDOSTAT

HAGERSTOWN, INDIANA • DON MILLS, ONTARIO, CANADA

Power Pace-setters for over 50 years . . .

VOLVO DIESELS

are rugged, economical, outstanding performers



Put this power *that pays for itself* to work for you! Superbly designed and built in Sweden, VOLVO Diesels feature direct injection, open combustion chamber, 4-cycle operation. They purr into action at the press of the starter, cost very little to run and maintain, have a world-wide reputation for durability and quiet, smoke-free service. 9 models, 1 to 6 cylinders, 5 to 185 h.p. for industrial, stationary and marine service. Cutaway shows typical Volvo construction features.

Toroidal "noiseless combustion" chamber (6) perfectly blends fuel and air to provide maximum power output and fuel economy, eliminating carbon deposits and wasteful exhaust fumes.

Wet cylinder liners (8) with rubber "o" rings mounted in engine block stop corrosion and wear, preventing cylinder misconfiguration. Pistons are quick and easy to replace. Eliminates costly reboring.

Wear-resistant valves (3) are built for extra long life. Stellited faces (4). Hard-chromed stems (2). Specially hardened alloy caps (1).

Long-life light alloy pistons (5) with hard-chromed upper piston rings resting in inserts (7) of special cast iron to withstand heat and pressure.

Other outstanding Volvo engine features: Large bearing areas (9). Viscosity type torsional damper (10). Steel-laminated head gaskets (13). Dual cylinder heads (11). Time-tested multiple unit injection pump (14) for accurate precision fuel metering. Full-flow lub. oil filter (15). Split-type manifold (12) to avoid heat stress breakage.

Write for complete data on
entire Volvo diesel engine line and Volvo service.

Volvo Import Inc.

452 Hudson Terrace, Englewood Cliffs, N. J.

VOLVO

NEW PRODUCTS . . .

(Continued from page 80)

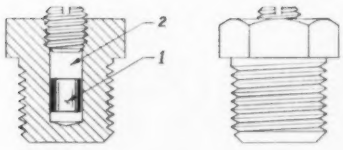
New Crankshaft Regrinder Cuts Your Set-up time!

Latest from Van Norman Machine is their new 46-in. Rap-o-Matic crankshaft regrinder. It's loaded with new features that'll mean faster setup time and increased productivity. For instance, Model 438 has a 360-deg. head and pendulum cross slides . . . and there's a foot stock with instantaneous counter balancing when you're grinding mains and rod journals. Additional time-savers include a head stock with fast-positioning counterbalance. And there's a steady-rest with built-in dial indicator . . . power-driven wheel head retraction and table traverse . . . plus easy stand-up height with controls that are grouped for greater operator convenience. One-shot Bijur lubrication is another example of Van Norman's "you in mind" design. Their new Rap-o-Matic features a 7-in. stroke, 18-in. swing . . . and a 24-in. grinding wheel.

Stops Crunching 'n Squeaking . . .

Pure Oil Company has a new grease called Purelube Golden-Grease that's claimed to eliminate "crunch and squeak" in those tempermental ball-joint suspension systems. Additional oiliness is the answer, says Pure Oil. They recommend their new Golden-Grease as a multi-purpose lubricant for fittings, wheel bearings, universal joints . . . your 5th wheel and water pumps. Won't splatter . . . even under high loads. And its 380 to 390°F melting point means that you don't have to worry about how close you're using Purelube to those brake drums.

Use your dp Reader Service Card.



1. Floating alloy pellet.

2. Drill bore encasing pellet.

Engine Rebuilder's Secret Spy . . .

"Hey, that engine you rebuilt just seized up! Nope, ran it nice and easy . . . never overheated it."

If you remembered to install a "Heat-Tec" fuse-alloy plug you'll know for sure whether it has been run hot. Heat-Tec plugs, manufactured by Leonard Davis Sales Company, tell you positively if the engine has been run hot . . . has been ever operated with low water. A low-melting-point alloy inside the Heat-Tec plus tells the story, ends the guesswork and arguments. Easy to install—just tap through cylinder head into water jacket. You can pay for a lot of them by proving one warranty claim unwarranted.

Use your dp Reader Service Card.

Free Fleet Survey . . .

Now you'll know at a glance just what replacement filter belongs in every piece of your equipment. Wix Corporation makes maintenance easy for you, helps reduce those filter inventories to just the ones you'll be needing. Here's how it all works.

Wix comes into your shop and makes a free survey of all your engines, listing the correct air, lube & fuel cartridge for each engine—you get a plastic-covered copy for your shop wall and so does your local Wix distributor. Means you know immediately exactly which replacement you want—and so does your Wix distributor. Also available—and free too—is a new loose-leaf Fleet Manual. Mighty handy place to keep track of your maintenance schedules.

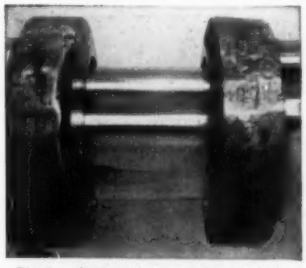
(*Continued on page 84*)

THIS CRANKSHAFT JOB NEEDS A SPECIALIST

This is specialized work, rebuilding crankshafts—intricate, exacting, and naturally expensive. It's the kind of work that demands a specialist . . . and we are just that!

We've specialized in rebuilding crankshafts, because since 1916 we've *made* crankshafts. And who knows better than a maker what are the "musts" of a sound, economical repair job. We'll take your worn crankshaft and rebuild it, if salvagable, through the carefully controlled steps of grit blasting, replating, regrinding and thorough inspection. And we'll deliver it back with a guarantee for 100% performance that only a manufacturer-specialist can provide. May we quote on your next job?

For more details on crankshaft repair write for Bulletin RC-3



This is a finished, repaired crankshaft, after processing by National Forge.

NATIONAL FORGE COMPANY
IRVINE, WARREN COUNTY, PA.

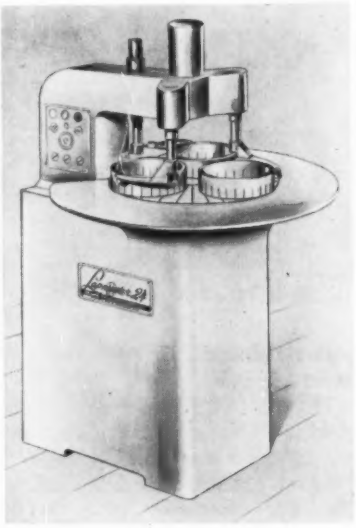
(Continued from page 83)

1725 KO's Per Minute!

Ingersoll-Rand's newly redesigned Impactool is claimed to deliver 20% more wallop—1725 blows per minute. Designed to fit comfortably into the palm of your hand, the new tool has a heavier impact mechanism and larger motor. Working off a ⅜ in-square drive on 110 or 220 volts. I-R's Impactool easily converts to drill, reamer, tapper, wire brush tool etc.

Fordson Diesel Gets "Super-Duty" Loader

Ford's new loader comes in ⅝, ¾ and full yd bucket sizes with a lifting capacity of 2500 lb and a breakaway capacity of 5500 lb. Reach of Fordson's new loader is over 11 ft and it easily loads standard-size dump trucks from one side. Ford says their new "super duty" loader can be mounted in combination with back-hoe, counterweight boxes, fork, crane, blade, etc.



Check your Lap, Sir?

Here's a new tool that automatically checks and maintains your lap plate flatness. Lapmaster's Model 24 gives you *automatic* quality—control within extremely close tolerances. Has an exclusive 3-point sensing head that checks up on your lapping errors to within (now, get this) 0.0000116-in. on a 3-in. section! And Lapmaster automatically adjusts itself . . . regardless of shape or form to the particular part. It's from Crane Packing Company.

This Vibration "Watchdog" Uses An Air "Leash"!

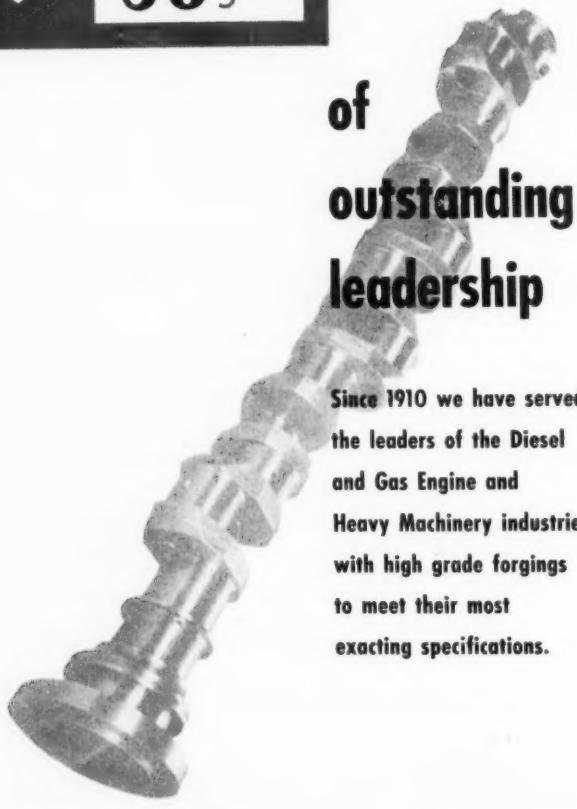
If you want to monitor vibration as an indication of machinery malfunctioning (and you can't use electrical protection instruments) here's your answer. It's a new VibraSwitch, Model 67, from Robertshaw-Fulton Controls Company. VibraSwitch operates by opening a bypass valve in a pneumatic line, letting air in the line escape. Gives immediate detection of increased amplitude, increased velocity of vibration. Even responds to high-frequency, low-level vibration . . . warns you at the start of bearing failure, broken ring or similar malfunction. Control ties in with pressure-loss sensing equipment that actuates shut-down sequencing gear.

Use your dp Reader Service Card.

CEF 50th year

of outstanding leadership

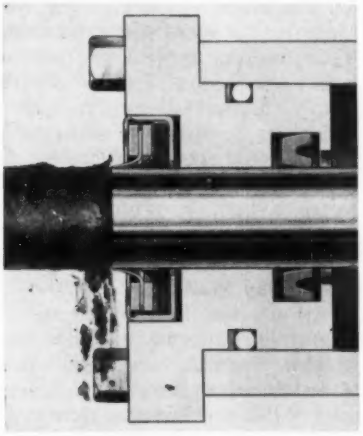
Since 1910 we have served the leaders of the Diesel and Gas Engine and Heavy Machinery industries with high grade forgings to meet their most exacting specifications.



Write for estimates on your forging requirements.

ELLWOOD CITY FORGE CO.

ELLWOOD CITY, PA.



This Rod Wiper Wipes & Scrapes Simultaneously!

Mud season is here—and here's a new rod wiper seal that's also a scraper! If you're having trouble with those hydraulic cylinders, Chicago Rawhides' SC Wiper-Scraper-Seal can give lowcost protection for your cylinder packings against heavy dirt accumulations during the coming months. Takes care of caked mud, tar . . . helps prolong packing life and keeps those finishes factory-new. Seal consists of a thin brass scraper ring in tandem with a pliable synthetic rubber wiper. Easily installed . . . economical too!

Simple Battery-Starter Tester From Simpson Electric

Simpson Electric has a new combination charging - battery - starter - tester designed to service all 116, 12, 24, and 32 volts AC-DC high/low output systems. Tester features Simpson's exclusive Auto - Ranger meter. You just turn selector, Model CBS does the rest—automatically setting up the correct circuitry and bringing the proper scale to meter window. Meter lets you know whether circuit or unit is up to snuff. Sounds like a mighty handy thing to have around the shop.

Ball Indicator Checks Flows . . .

If you want to know—and know at a glance—just how the water in your cooling system is moving . . . whether lubricating oil is getting to those bearings . . . here's a nifty little ball-type flow indicator from McIntosh Equipment that measures water flows down to 0.075 gpm . . . measure air and gas flows to ½ cfm. You can watch the ball dance inside a sturdy glass dome—and 'long as you see that ball you're safe. Comes in ½-in. size up to 100 psi . . . in bronze housing.

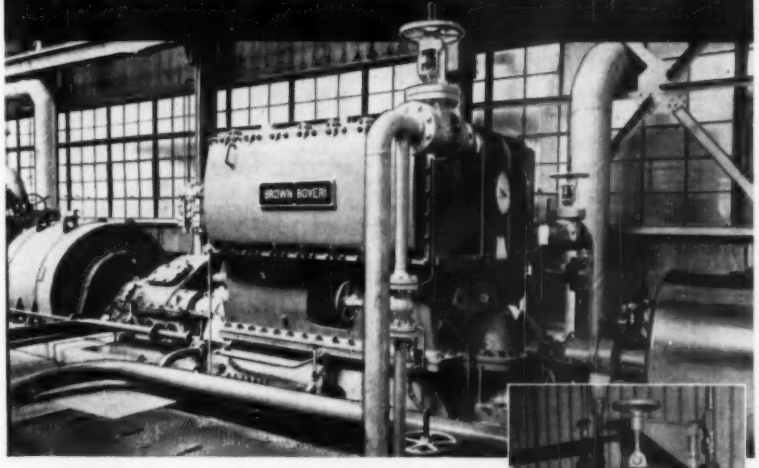
Compact Rotary Gas Meter For Line Mounting

Root-Connersville's new rotary gas meter—described as being "so small it's just a bulge in your line" —can be flange-mounted directly in either a horizontal or vertical gas line without need for additional support. R-C's 3M125 meter provides straight-through gas flow, ranging up to 3000 cfh, combined with working pressure rating of 125 psig. Claimed to be ideal for measuring industrial and commercial loads, especially in remote locations. Features rigid, cast iron construction. Yet meter weighs less than 55 lb.

(Continued on page 97)

NUGENT FILTER

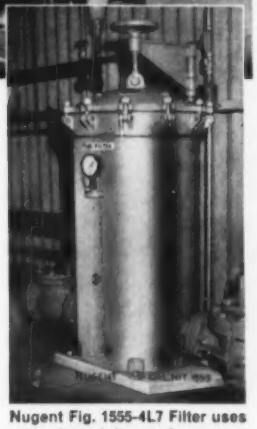
protects gas turbine bearings



Recharges changed just once a year

One Nugent Filter, Fig. 1555-4L7 handles all the lubricating oil for this 3000 HP Brown Boveri Gas Turbine. Continuous full-flow filtering removes harmful impurities before they can form sludge or acidity. Foreign particles 5 microns and smaller are trapped. Recharges are changed only once a year, due to extended capacity.

Need a single filter or a complete system . . . contact Nugent, today.



Nugent Fig. 1555-4L7 Filter uses laminated disc recharges.

ESTABLISHED 1897

REPRESENTATIVES IN PRINCIPAL CITIES

WM. W. NUGENT & CO., INC.

3426 CLEVELAND STREET, SKOKIE, ILLINOIS

OIL FILTERS • STRAINERS • TELESCOPIC OILERS
OILING AND FILTERING SYSTEMS • OILING DEVICES
SIGHT FEED VALVES • FLOW INDICATORS

diesel power new literature

Interested in Learning Facts of Life?

Engine facts, that is. Caterpillar Tractor's new 6-page booklet gives you numerous valuable tips to follow when re-building. Reconditioning tips on installating cylinder liners . . . on how you can check for worn valve guides . . . a tip on what to do before you replace rings. "Some Facts of Engine Life" is quick reading—maybe 5-minutes at the most—but it should help keep your downtime down.

Standby Electric Plant Selection . . .

You'll find practical suggestions for planning, selecting, designing and installing your standby power in a new 8-page bulletin, "Standby Electric Plants and Controls." It's from Onan & Son.

Need Air? Compressed, That Is . . .

"Economical Air For Industrial Needs" is the subject of a new 16-page brochure just off Cooper-Bessemer's presses. Describes use of compressed air for industrial requirements with detailed discussion of C-B's new "DMR" line, ranging from 100 to 400 hp in one, two and three-stage units. You'll find cutaways of each unit . . . also a complete component part breakdown. Gives you a good idea very quickly just what Cooper-Bessemer has in compressors.

Need Some Professional Maintenance . . .

If you've a maintenance problem—routine or emergency—here's an outfit that makes a business of taking care of trouble. You'll find out all about National Marine Service in an illustrated 8-page brochure that describes the repair and replacement parts facilities available to those of you in the marine, gas and electric utility, transportation and pipeline industries. NMS specializes in maintenance contracts and emergency repairs on heavy-duty diesels. You can come to them . . . or they'll come to you.

Grease By Mail . . .

Are you one of the 20,000 production and maintenance engineers who received a sample tube of Molykote G last month in the mail? Free samples of this new lubricant were mailed along with a colorful 4-page folder describing this new production tool for industry. Molykote G is manufactured by Alpha-Molykote Corporation, world's largest manufacturer of molybdenum disulfide lubricants . . . and you'll find it used wherever fretting, galling, seizing and metal pickup is a problem. Yes, sample tubes are still available if you'd like one.

FREE to Every Shop Operator

BACHARACH DIESEL SHOP MANUAL FOR AUTOMOTIVE DIESEL ENGINES BULLETIN AD54

76 Pages—275 Illustrations
56 Engine Reference Tables
26 Parts Lists

- Diesel Compression Testers
- Nozzle Testers for American Bosch, Caterpillar and Bendix Nozzles
- Cummins Injector Tester
- International Harvester Injection Testers
- General Motors Injector Testers
- Injection Pump Calibrating Stands
- Nozzle-Injector Cleaning Tools and Lapping Blocks
- Engine Overhaul Stands
- Engine Removal and Parts Dollies
- GM 71 Engine Tools

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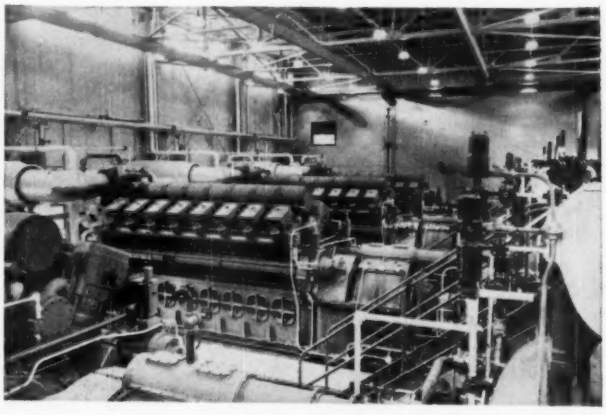
AD-15



NORDBERG DIESELS AND KITTELL SILENCERS... An efficient power team!

Kittell's unique louvred design stops damaging back surge. As exhaust gases enter the silencer they are instantly bled off by a special perforated tube, then directed through louvres along the outer shell which cools them and reduces their volume. More louvres guide them back into the center of the silencer and then out into the atmosphere. This efficient design smooths pulsations, produces a whisper-quiet, exhaust flow. Available in a variety of sizes and designs for every noise application. Write for catalog.

Kittell

KITTELL MUFFLER and ENGINEERING, 1977 Blake Ave., Los Angeles, Calif.
17 years of experience in SILENCE!

Clark's 10-50 hp Air-Cooled Torque Converter

If you're running small road rollers and construction machines, farm tractors or agricultural equipment in the 10 to 50-hp class and want smoother, better performance, here's a new air-cooled torque converter. Easy to apply . . . doesn't need special cooling accessories. New bulletin from Clark Equipment Company's Automotive Division gives you all the specs . . . the performance curves . . . as well as a rundown on the dimensions. Completely self-contained, this compact 9-in. torque converter mounts easily and quickly to SAE No. 4 flywheel housing. Maximum input torque is 80 lb ft . . . stall torque ratio is 1.7 to 1.

A-C's New Construction Machinery . . .

If you're running construction equipment, you'll certainly want to sit down with these new full-color bulletins from Allis-Chalmers Construction Machinery Division. There's a 20-page catalog on A-C's new 340-hp, 30-yd heaped TS-360 Motor Scraper . . . and a new 4-page folder on A-C's D-10 and D-12 utility tractors . . . plus a new 16-page catalog on the Model D Motor Grader . . . also an 8-pager an A-C's TS-160 motor scraper, 155-hp, 9.5-cu. yd. heaped. Mighty nice reading for a Spring evening and handy reference when you're ready to buy.

Speed Reduction Made Simple . . .

Here's one solution for your speed reduction problems. Dodge Manufacturing Corporation's fat new 64-page catalog gives you the complete lowdown on their torque-arm, shaft-mounted speed reducers that come ready for direct-mounting on your driven machine. It's all in here—construction details, dimensions, prices and installation information. Catalog also covers reducers for flange mounting . . . vertical shafts . . . right angle drives . . . and screw convevor drives. Dodge's Torque-Arm Reducers are built to handle up to 170 hp . . . output speeds from 10 to 400 rpm . . . in single and double reduction series . . . with 5 to 1, 15 to 1 and 25 to 1 ratios.

Use your dp Reader Service Card.

Hermetic Sealing Specialists . . .

New brochure from General Hermetic Sealing Corporation takes you from department to department inside GHS's modern plant . . . lets you follow the careful precision process that makes this company one of the country's leading sealing specialists. GHS's plant is the "home" of GASEALS, unique new high temperature-high pressure sealing tool. Consisting of hollow tubular rings (of mild steel, stainless, monel, cupro-nickel or copper alloy) GASEALS are filled with an inert gas under 600 psi and fit into protective grooves. They've attracted considerable interest in the diesel field.

Hoerbiger Valves . . .

Plate, guided strip, flapper and crankcase safety valves are described in Hoerbiger Corporation's new 4-page bulletin. If you're thinking about replacing, better look into this excellent line of valves. They make a complete line of products—a special valve especially designed for your particular valving problems.

(*Continued on page 88*)

FUEL INJECTION EQUIPMENT DIVISION OF
LUCAS ELECTRICAL SERVICES, INC.

Head Office: 501 West 42nd Street, New York 36
Sales Office: 14820 Detroit Avenue, Cleveland 7, Ohio
West Coast: 5025-29 W. Jefferson Blvd., Los Angeles 16, California
Branch Offices: 171 Beacon St., South, San Francisco California
5001 West Belmont Avenue, South Chicago 41, Illinois
400 South Edgewood Avenue, Jacksonville, Florida
Canadian Distributors:
Joseph Lucas (Canada) Ltd., Head Office: 11 Davies Avenue, Toronto 8, Ontario
Branch Office: 3401 St. Antoine Street, Montreal 30, Quebec

AP929

(Continued from page 87)

Torque Converters, Heat Exchangers'n Clutches

Here's a new 18-page brochure from Borg-Warner's Long Manufacturing Division. Gives you a guided tour of their plant—through the engineering department . . . the production line . . . and testing section. Itemizes the many special steps that go into making their torque converters, heat exchangers and clutches.

Clark's Turbocharged Vee 2-Cycle Gas Engine . . .

Interested in the big ones? Up to 16 cylinders . . . 6400 bhp? Well, Clark Bros. have a new 26-page catalog that tells all about their new Model TPV, 2-cycle, Vee gas engine. It's turbocharged . . . and is designed especially for driving centrifugal pipeline compressors, generators and liquid pumps. Catalog is in color and very complete.

Fittings, Valves, Couplings . . .

Imperial Brass Manufacturing Company's Hi-Seal butt-joint fitting line is covered in a new 44-page catalog. Claimed to be "industry's most complete engineering file on any single fitting." You'll find it full of usable engineering data . . . from assembly instructions to vibration, from brazed fittings to valves. And you'll get all the facts here—capabilities as well as limitations.

MAXIM for Attenuation

SILENCERS
ENGINEERED FOR:
WASTE HEAT RECOVERY . . .
STEAM, AIR OR GAS DISCHARGES . . .
JET ENGINE EXHAUST AND INTAKE . . .
INTERNAL COMBUSTION ENGINE EXHAUST AND INTAKE . . .
AIR COMPRESSOR INTAKES AND DISCHARGES . . .
BLOWER INTAKES AND DISCHARGES.
SEND FOR LITERATURE.

Emhart Manufacturing Company
Maxim Division / Dept. 93
Box 216, Hartford 1, Connecticut

EMHART

I-H's New TD-25 . . .

International Harvester's biggest crawler is the star of a new 24-page catalog just received from I-H. And the TD-25 is big—has a 230-hp diesel engine, the DT-817 direct-start, turbocharged baby. Comes with torque converter or gear drive. With a torque converter, the tractor has a draw-bar pull of up to 70,000 lb! All the facts are here to help you make the big decision about this big one.

What's Perking at Perkins?

World's largest diesel engine manufacturer—Perkins of Peterborough, England—has a bundle of beautiful new engine bulletins just off the press. In them you'll get detailed information . . . the complete specifications and performance data on Perkins' P-6, Four-207D, Four-99, P3-144, Six-288, 305- and Four-203. All the facts on these power plants are here. Chock full of graphs and also includes a liberal scattering of photos.

"Emergency Power For Hospitals"

That's the title of a new booklet from GM Diesel. In it you'll find the case for standby generators for our hospitals. Flipping through the 8-pages of this brochure you'll see actual "case histories" of various hospitals around the country . . . the details on which particular "Jimmy" each hospital decided was best for their particular standby problem. Includes complete specifications on GM Diesel's single and multi-engine generator sets.

Use your dp Reader Service Card.

(Continued from page 33)

Leckey To Garrett's San Diego Sales Office

Roy S. Leckey is moving up to manager of San Diego regional sales office for Garrett Corporation. Leckey, with Garrett for 18 years, has been active in sales and contract adminis'ration at Garrett's AiResearch Divisions in Los Angeles and Phoenix. Five of those 18 years were spent in the Pentagon administering and negotiating contracts with the military.

Hugh J. Hush

Hugh J. ("Harry") Hush 1905-1960

Harry Hush, familiar figure in the construction, industrial, engineering, marine and trucking fields, died suddenly last month in Ft. Lauderdale, Florida. President of Griffin Equipment Corporation of New York City and Lodi, New Jersey, Harry had recently celebrated his 25th year with Griffin. He was a past-president of Associated Equipment Distributors.

Eastern Distributor For Onan . . .

Onan Eastern Corporation of Long Island City, New York, has just been appointed exclusive distributors for Onan Products, builders of electric power plants. New firm (independently owned and operated) is headed up by Ralph Siegel, president; Martin Taylor, VP and sales manager; Leonard Freeman, assistant secretary and sales engineer. Distributorship will serve the greater New York City trading area with a complete stock of Onan electric generating plants up to 10,000-watts.

Griffin Equipment Appointment . . .

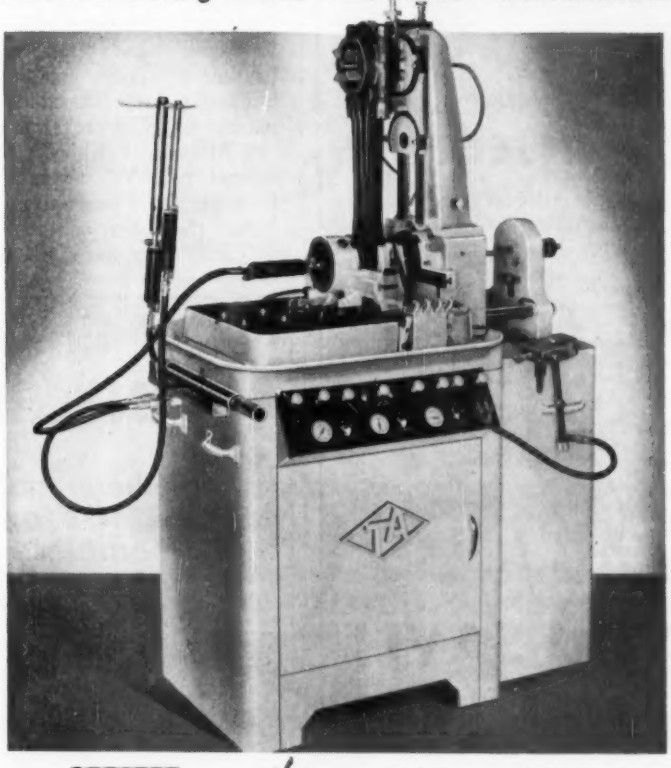
Robert B. Poorman moves up to manager in charge of the transmission and converter operation for Griffin Equipment of New York City and Lodi, New Jersey. Poorman, formerly with GM Allison Division sales in the Northeast, will be introducing an exchange converter and transmission program for heavy equipment users.

McKnight to Ontario GM Truck Sales Manager

Harold R. McKnight has been appointed manager of truck engine sales for General Motors Diesel Limited, London, Ontario. McKnight will be working with GM's new line of diesel engines for highway truck and buses, OEM plus repowering.

New TOBIN-ARP

Diamond Boring PIN FITTING MACHINE



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✓ Faster, cuts job time one-third

✓ Added rigidity for superior performance

✓ Adds profits to every engine rebuilding job

Write today for complete information

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your
GM INJECTORS

or
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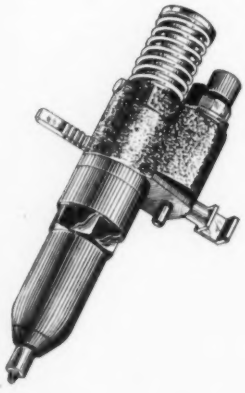
your
GM INJECTORS



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COMPLETE INJECTORS
from

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DIESEL SERVICE CO.
GArden 2-9643
2423 PARK ST., FINDLAY, OHIO
Send Your Worn Units Today!

NEW DIESEL POWERED EQUIPMENT:

▲ Brockway's New Bunk . . .

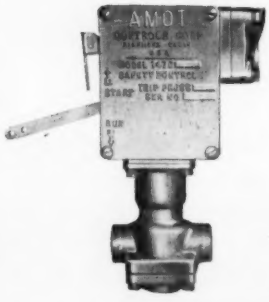
Brockway Motor Trucks has a new sleeper cab in their 258 series — and it won't be cutting into your payload either. Dimensions are only 6-in. less than those you'd find in a conventional over-the-road tractor! Patterned after their 87-in. Huskie, Brockway's new 258 all-steel sleeper has lots of window area around the bunk. No more closed-in claustrophobia when you're sacked out in this Brockway bunk — windows all around you. What's more, you'll have plenty of ventilation as well. Notice those wing vents, one of 'em on each end of the bunk. Plenty of room for big guys, too — exceeds ICC requirements. Width is 23½-in., length is 75⅜-in. Headroom? You've got a full 21-in. of that. And (get this) there's a beauty-rest innerspring mattress as standard equipment. What more could a fellow ask for in the way of sacktime accommodations?

▲ Six Wheeler At Work . . .

This diesel-powered International RDF-212 is working on a modern ocean front office building down in Miami. Dump body is all-aluminum —13-ft. with a 15-yd capacity. There's a Cummins NH-180 diesel

DO ENGINE CONTROLS INTEREST YOU?

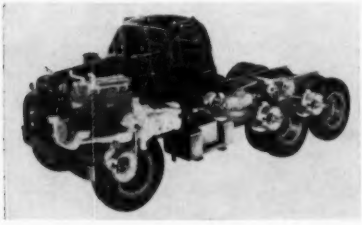
Then—call or write AMOT for the most complete selection of rugged, reliable, Safety and Thermostatic Controls.



Ask the AMOT representative for information on the new Model 2800 Safety Control.

AMOT CONTROLS CORPORATION
FIRST ST. & NEVIN AVE. RICHMOND, CALIFORNIA
Representatives in Principal U. S. Cities

under the hood . . . has direct-in-fifth transmission and power steering. Belongs to DesRocher Sand Company's fleet.



▲ Aluminum In Macks Means Bigger Payloads . . .

Cheek that cutaway picture above—all those light areas indicate where Mack used aluminum or some other light alloy metal to shave tractor weights. Means Mack's new "B" and "H" models—6 of 'em in all—save you up to 405 payload lb in chassis weight reductions.

From front bumper to the rear spring insulator housing caps, Mack's six-wheel "Aluminum-light" series of six-wheel tractors are built with weight in mind. Looking at 'em you'd suppose they just stepped out of a Slenderella salon!

Mack's "B" model six-wheeler is rated at 72,000 GCW . . . "H" models, specially designed for long-distance hauling of high-cube trailers, are also rated at 72,000 lb. GCW. For use where payloads are not variable, as in haulage of liquids, Mark still offers their steel standard models. But where dry freight is carried (and every single ounce counts) Mack is removing all the heavy metals possible. Airplanes have done this sort of thing for a long time . . . and it's high time truckers got the advantages of these extremely strong lightweight materials.

These new lightweight Macks come equipped with a Mack 10 or 15-speed transmission. Power is supplied by the Mack thermodyne diesel.

There's an old axiom in the trucking industry. It goes something like this: "Operators will gladly pay a dollar for every pound you save them in truck freight." With Mack's new lightweight series looks like the bargain is even better than that. Your saving of up to 405 lb in possibyle payload pounds can be had for only about $275, over steel-component standard models.

▲ New Sleeper From Dodge . . .

Dodge's new cab-forward trucks get their first sleeper—and it adds only 22-in. to Dodge's 89¾-in. BBC dimensions.

BETTER ENGINE PERFORMANCE . . . LONGER PARTS LIFE . . . LOWER COSTS

CAN DO ?!

CONTENTS 32 FLUID OUNCES · MADE IN U.S.A.
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1/4 THE TIME, 1/2 THE COST!

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THE Lix PRODUCTS OF RESEARCH

300 W. 80TH STREET — DEPT. 30

CORPORATION OF MISSOURI

KANSAS CITY, MISSOURI

PISTON DESIGN . . .

(*Continued from page 63*)

weight on the bearings. To accelerate results, if any, it was decided to install an earlier groove-type bearing. These had previously been replaced by the railroad with a grooveless type that gave better service life. Despite use of the less-favorable design, no measurable wear on the bearings or crankshaft was reported at the time of test inspections.

Now, Ready For Testing . . .

Gillett & Eaton submitted their final design . . . and received approval for a test lot of 36 pistons. (Both G&E and railroad agreed that after the pistons were installed and thoroughly tested every effort would be made to work out any problems which might show up.) The new pistons were installed in a locomotive and after 13-hr operation, the test was suspended in order to correct clearances which appeared to be insufficient for the conditions encountered. G&E revised the skirt contour and test was resumed.

At the conclusion of the load-box test—which showed that the clearances and skirt contour would be satisfactory—the engine was found to be developing 1577 hp at 1000 rpm's. The hp and rpm is considered to be well within the expected output of this engine, in fact, it was a little bit better.

After 30-days of operation three pistons were removed from this engine and returned to us. They were thoroughly checked, given an okay and re-installed. Next examination was five months later at the locomotive's regularly scheduled semi-annual inspection. Again it appeared that the pistons were performing satisfactorily. No problems were expected to occur during the remaining time on test. In fact, there wasn't any further check of this engine for another five months until its annual inspection. An examination of the pistons and related parts at that time proved conclusively that the new cast iron piston design had satisfactorily fulfilled the requirements for railroad service.

Accumulated Experience . . .

How are G&E's cast iron pistons holding up—are they proving themselves in the long run? Let's take a look at the record.

Of the cast iron pistons that have been installed during the last few years (many railroads have already made G-583's standard equipment) we have yet to receive a *single* report indicating a failure due to design or material defect. Of course, there's been occasional delays due to water leaks or other operational causes—but that's *all!*

G&E presently has close to two thousand of these high alloy cast iron pistons currently in railroad locomotives. Two years of varied type service without a failure—that's a pretty good recommendation. Good, careful design had paid off.

And it all began late one evening several years ago when a group of railroad people met to solve a maintenance problem . . .

WASTING COSTLY FUELS?

For diesels of ALL sizes and types . . .

POWER-PAL SAVES UP TO 10%!

With POWER-PAL, fleet owners report improved engine performance, and important fuel savings of up to 10%. High diesel maintenance costs drop sharply, as POWER-PAL keeps fuel injectors clean, dissolves harmful varnishes, disperses moisture, and reduces engine deposits. For the money-saving answer to *your* diesel fuel problems, choose POWER-PAL!

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POWER-PAL

Remember . . . Power-Pal is not an ordinary diesel fuel additive. It is a CONCENTRATED DIESEL FUEL CONDITIONER!

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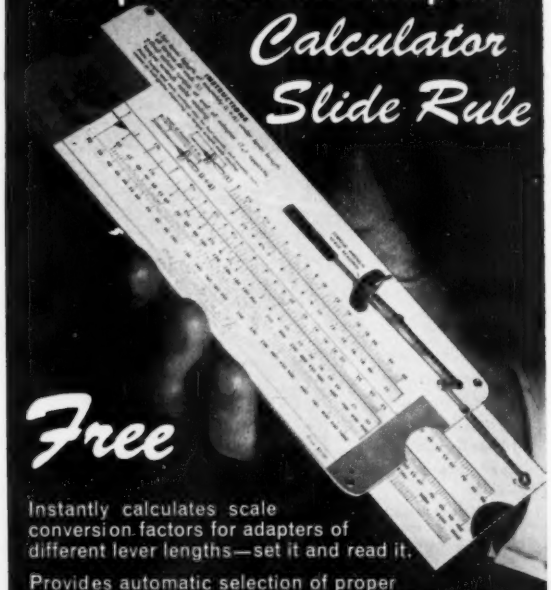
Torque Wrench Adapter Calculator Slide Rule



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Provides automatic selection of proper torque wrench for adapters and/or proper adapters to go with given torque wrenches.

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ADDISON QUALITY ILLINOIS

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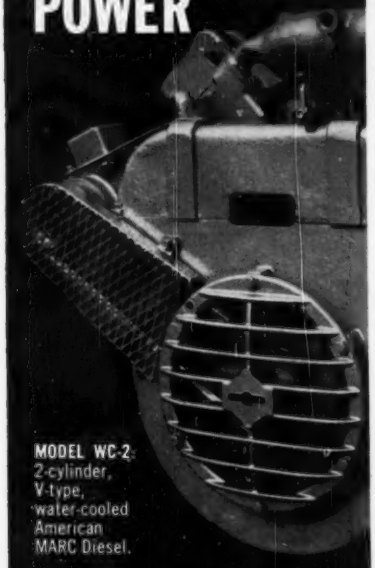
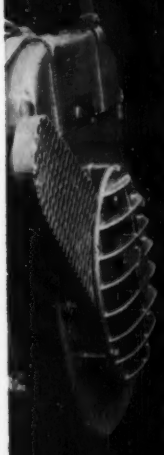


MODEL WC-2: 2-cylinder, V-type, water-cooled American MARC Diesel.



Power for the long run or immediate stand-by with absolute dependability. That's American MARC...specializing in the development and manufacture of diesel engines, generators and generator sets of the highest quality and reliability. Engines from 9 to 28 HP. Generators from 500 watts to 100 KW. Standard Generator Sets from 3 to 10 KW. Other equipment to your specifications.

Write, wire or 'phone for complete information.

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1601 West Florence Avenue, Inglewood, Calif.

NEWS SECTION . . .

(Continued from page 31)

LMOA
Pre-Convention Presentation Program Rolling

"When you've got something good, get it across to all the people that you can." This is the thinking behind the Locomotive Maintenance Officers Association's Pre-Convention Presentation Program.

In pointing for their September Annual Meetings, a tremendous amount of valuable information is amassed. Yet formerly, this was presented only to those attending this meeting. Their present approach makes this available to a great many more railroad men who can put it to good use.

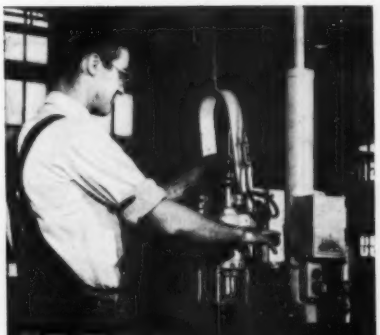
President Lehr points out that total attendance at Pre-Convention Presentation programs, scheduled at Railroad Diesel Clubs around the country, is 50% greater than at the Annual Meeting. Also, this attendance is substantially all "plus" coverage since less than 10% of these at the regional meeting attend the Annual meeting. LMOA as well as the individuals benefits too. As a result of these "trial runs" a great deal of information is obtained for incorporation in reports made at the Annual Meeting.

Additions to Editor's Wall . . .

We received a handsome certificate for our wall here last week from the Association of Diesel Specialists. We are proud to have been a part of the formation of ADS during its early days . . . and are very proud indeed of this certificate. Pardon us while we quote: ". . . whereas, Mr. Brian Emerson, has rendered outstanding leadership and distinguished service in behalf of the Association of Diesel Specialists as an advisor to the board of directors, be it resolved that a certificate of appreciation be awarded to him as a small token from those for whom he so served."

We were not alone in the above honors. ADS's past-president as well as retiring members of the board of directors were also similarly honored with handsome certificates during the recent Denver meeting of ADS.

(Continued on page 99)



HALL TOLEDO
eccentric valve seat grinding
GETS HEAVY DUTY ENGINES BACK IN SERVICE FASTER!

Now, at the Milwaukee Road, EMD, 567B and C cylinder heads are reconditioned at a rate of 58 per day — *quadrupling the former rate.*

At the core of this vastly improved production is a Model EDP *eccentric* valve seat grinder that produces seats with precision in 2 minutes, or 7 minutes per head. The *eccentric* grinding principle, and its benefits, are exclusive with Hall Toledo.

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Please send me complete details about applying the benefits of eccentric grinding to the following type of valve seat production:

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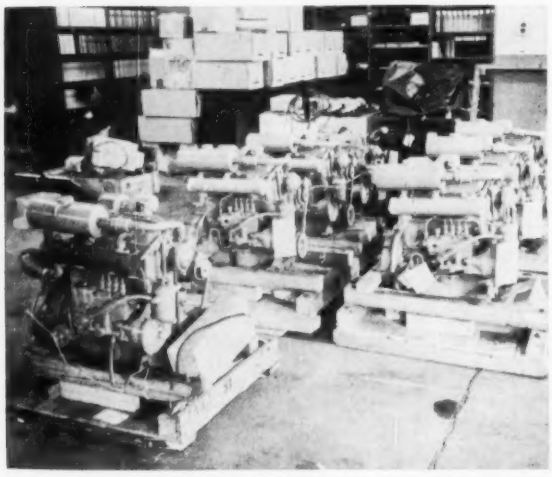
Mercedes-Benz Sales/Service

(Continued from page 40)



These M-B diesels are slated for boats in Freedomland USA — Eastcoast's Disneyland.

engines. They will work with OEM accounts and with dealers and distributors in special application problems. We're setting up a complete shop. This will have two functions. It will process engines as they come in, assuring that they have the right accessories and attachments as ordered by the customer. Of course, in the case of OEM accounts, special arrangements will be made for direct shipment from the factory to avoid loss of time and extra trans-shipping expense. This shop will also serve as a training center for OEM account or other customer personnel."

"Facilities here will also include a central parts handling and storage depot. Of course, bulk storage will be handled at our nearby warehouses; shipments being with drawn, broken down and handled here for distribution into the U.S. market. We'll know what parts are on hand and based on the engine population in the area covered, how many of each should be in our base stock and in our sales outlet stocks."

Asked about distribution and parts availability, he said, "We have full parts responsibility for industrial and marine engines sold in this country. Parts will be available through the OEM's dealer organizations. For example, Thermo-King's dealers will have them. Our distributors and dealers will also have ample stocks.

Winding up, Mr. Carroll stated, "We're going to move into this highly-competitive field as rapidly as possible. However, we're not going into areas and applications until we are sure that the customer has the right engine, properly applied for his job and that he is adequately backed up with parts and service."

Full-Flow/By-Pass . . .

(Continued from page 36)

Outside installation on Mack diesel makes servicing job on the "Duleflow" filter even easier. So do bottom drains.

Luber-Finer's "Duleflow" filters come in 2 sizes—Model 980 for diesels with crankcase capacities up to 5 gal; and Model 1250 for those up to 8 gal. This type filter, of course, can be installed only on engines that have provisions for connecting a full-flow filter. If your engines aren't designed for full-flow, check with your engine builder. He'll be able to tell you how to take advantage of this modern full-flow/by-pass filter.

Meets Important Need . . . .

This new "Duleflow" filter from Luber-Finer really fills the bill! Number one, it eliminates multiple filter housings . . . and, number two, it cuts down maintenance time. Not only do you get full-flow oil filtered to 45 microns . . . you also are assured of extremely fine filtration of your whole oil supply at least once every 5 minutes. And it's all in one compact unit, designed for easy installation and servicing.

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PRODUCT NEWS . . .

(Continued from page 85)

Adjustable Plug Keeps Dirt Out, Liquids In!

That old plug that holds the fizz in your opened soda bottle has grown up! You'll find 'em on engines today—aircraft as well as diesels. They're being used to keep dirt out . . . and you'll find these plugs also sealing liquids in while blocks and radiators are being tested. Moeller Manufacturing Company's "Snap-Tite" plug is designed for low pressure applications. Just press

"Snap-Tite's" cam lever down and twist . . . shapes to fit square, rectangular, any odd-shaped openings you've got in mind. For higher pressures, use Moeller's "Turn-Tite"—handle lets you adjust pressure even in the closest spots. Both are quick-closing, quick-opening . . . save money by eliminating need for threads. Come in stainless steel, brass, cold-rolled steel zinc-plated. Adjustable plug is neoprene. If you've got a sealing problem, here's the stopper for you.

Flexible Coupling With Spring Cushion!

Here's a flexible coupling from Gerbing Corp. for heavy-duty use in 35 to 75 hp ranges, up to 1800 rpm, 5½-in. shafts. Non-metalic separators give you a spring-cushion against vibration, shock, misalignment.

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720, 900, 1200, 1800 RPM.

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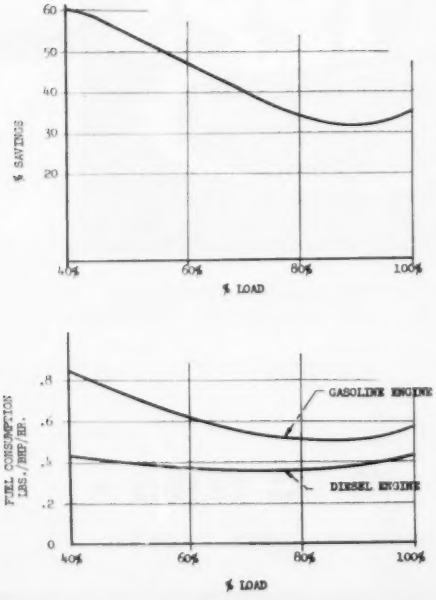
Diesel—Fact or Fancy?

(Continued from page 68)

Percentage fuel saving of diesel over gasoline engine throughout load range based on BSFC curves below.



During Idling - Fuel Saving of Diesel is 75%
(or Diesel consumption is 1/4 of gas engine)

Smaller, lighter, and less expensive diesels are on their way as newer up-dated engine designs appear. Higher speeds are becoming practical through combustion research and gradual use of shorter-stroke engines. The turbocharger art has advanced remarkably in the past five years and usage will spread. Output increases of 20-25% by this means can readily be withstood by most engines without significant loss of durability. Output increases 50-100% can be achieved but careful evaluation must be carried out on total powerplant characteristics and durability to assure success. Special engine designs may be necessary.

Fuel injection equipment is subjected to continual review and its costs are gradually dropping as newer designs appear and as diesel acceptance permits higher volume tooling and production.

Efforts are continuously being made to reduce tooling costs by means of diesel conversion of already-tooled gasoline engines. Efforts meet with varying success. Designing for both gasoline and diesel engines in an original design has permitted common tooling in the past and this route will no doubt be successful in the future as new designs are laid down.

A final look in the crystal ball might show in the future that gasoline and diesel engine sizes must be very close together for a given horsepower. However, the diesel will continue to have a weight penalty and a higher price tag for sometime to come. It will traditionally have to continue to earn back this investment through fuel economy, lower maintenance costs and greater vehicle availability to meet operator schedules.

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NEWS SECTION . . .

(Continued from page 93)

Allis-Chalmers Expanding . . .

Plans are off the drawing board and the footings will be going in soon on the multi-million dollar expansion to Allis-Chalmers's Harvey, Illinois, engine plant. Over 500,000 sq ft of new plant space is being added, bringing the total plant area up to well over a million sq ft. New space is needed, according to Owen J. Higgins, general manager of the Harvey plant, for additional diesel engine production as well as natural gas, butane and gasoline engines.

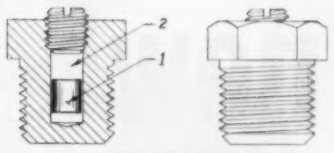
Electrical Analog Spots Trouble Ahead-of-Time

Worthington Corporation is taking a careful look into the future these days—and they're not using a crystal ball either. What they are using is a unique electronic machine that allows Worthington engineers to accurately predict compressor and gas line system performance while it's still on the drawing board.

Called Analog, this electrical wizard lets engineers spot vibration patterns in advance. To prevent harmful vibrations and pulsations, each stroke of the compressor and the exact length of each piece of pipe must be carefully coordinated. This is Analog's job. Problems that might crop up can be seen in advance and changes made before they become costly.

Proof of Engine Overheating

HEAT-TEC fuses threaded into water jacket will indicate if engine has exceeded safe operating temperatures, which could result in cracked heads or blocks, or piston or bearing failure.



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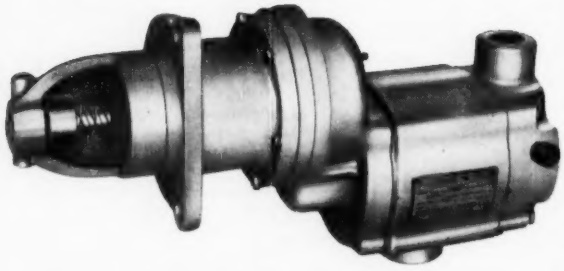

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Sludge in engine ends with switch to STANODIESEL Oil M

Situation: For five years a 1,400 hp. engine in the Municipal Light Plant, Arcadia, Wisconsin, was operated on STANODIESEL Oil M. During this time the engine ran free and clean. It carried a major share of the plant's 20,000 kw. output. A decision was made to switch the engine to another lubricant since it was believed one oil was as good as another.

What happened: Within two years the engine had sludged up so much, the oil had to be removed and replaced by STANODIESEL Oil M. Three months later the engine had cleaned up and was again carrying its share of the plant's load.

Clean engine operation is possible with STANODIESEL Oil M because of its superior base stock and its combination of additives that are available in no other oil. Superior base stock and exclusive additives give you these cost-saving operating and maintenance advantages: less sludging, low oil consumption, reduced port deposits, fewer stuck rings, less need for ring replacements, less cylinder wear, lower filtration costs, fewer bearing problems.

Get more facts about STANODIESEL Oil M. Call the Standard Oil office near you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

You expect more from **STANDARD** *and you get it!*

The team that got the engine back in shape; (l. to r.) Vernon Schwertel, Ronald Darbo and Standard's Fred Parkinson. Providing lubrication technical service on problems like this one is not new to Fred Parkinson. He's been doing it for 11 years. He has further qualification for such work—an engineering degree from Brown University. Fred has also completed the Standard Oil Sales Engineering School.

Quick facts about STANODIESEL Oil M

- Keeps crankcase, pistons, cylinder walls clean.
- Combats deposit and wear problems imposed by economy fuels.
- Maintains film on difficult-to-lubricate parts.
- Eliminates fuel injector and pump sticking caused by deposits on injector barrel and plunger where fuel and lube oil mix.

A remarkable oil ring material for lightweight diesel applications

In experimenting for a superior oil ring material for automotive applications, Sealed Power engineers were intrigued with the use of stainless steel for certain diesel applications. Put to the test, the stainless steel oil ring proved out in both design and material.

The expander (being of stainless steel) resists the pitting and etching effects of the gases of internal combustion engines. The surface stays clean and smooth; return oil vents don't plug.

Stainless steel has no significant tension loss at engine operating temperature. This means the expander continues to exert the proper, predetermined pressure on the side rails. They, in turn, maintain the proper sealing action against cylinder walls far longer.

Other key features: proper cylinder wall conformability • quick seating • chrome-plated side rails for long life • easy assembly and installation.

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